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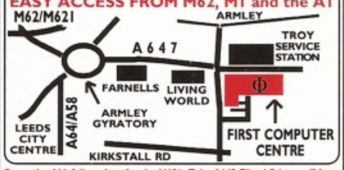
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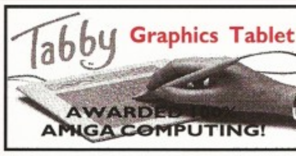
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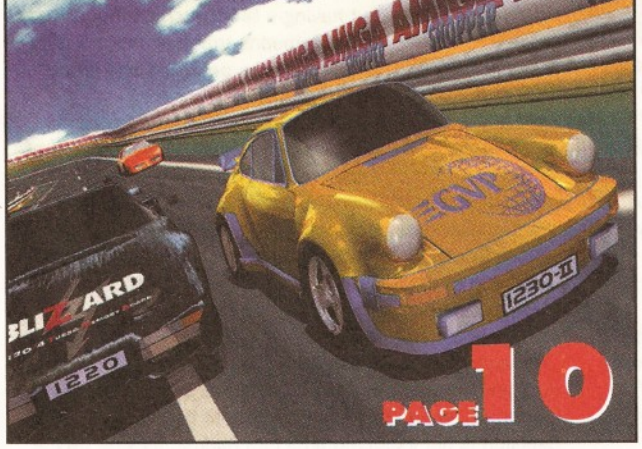


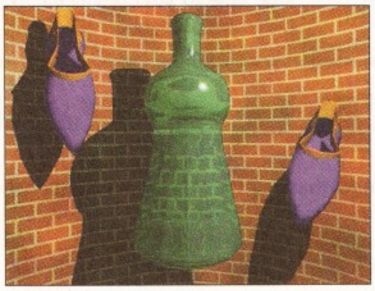
Welcome to Amiga Shopper! This magazine is dedicated to giving you, the serious Amiga user, the best. This is the magazine that reviews things in depth, as you can see from our Supertest of A1200 expansions. What other magazine would give you this level of information; tell you what sticking one of these cards will do to your machine? Who else gives you this quantity of facts and figures about how each of the cards performs?

Richard Baguley
Editor

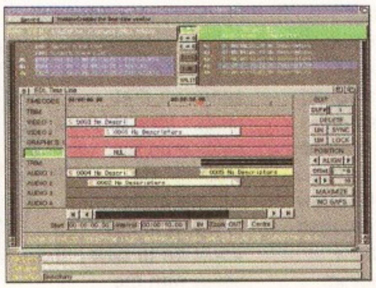
Mean Machine

How to turbocharge your Amiga – we'll steer you towards the right A1200 expansion





Will Freeform revolutionise the way that you build organic 3D objects? Gary Whiteley investigates on Page 22.



We take an exclusive first look at the future of non-linear video editing – Digital Broadcaster 32. See Page 19 for a sneak preview.

FEATURES

REVIEWS

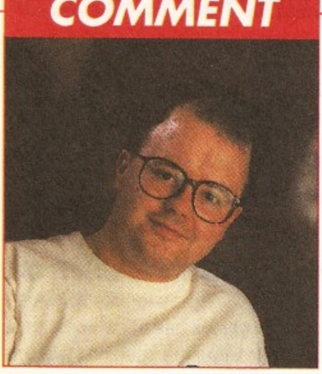
TUTORIALS

REGULARS

AMIGA SHOPPER

Everything you'll ever need to get the best out of your Amiga

COMMENT



Richard B ponders over this month's Amiga events...

Many people have already written off Commodore. I was recently in my local branch of Dixons, and after telling the Manager what I did for a living, he announced that Commodore were dead, and that Dixons had no plans to stock Amigas in the future.

Unfortunately, he is not alone. Whoever buys Commodore, the first priority should be to get Amigas back in the shops. This means cash, which can then be pumped back into developing new machines, thus ensuring the future of the Amiga in the face of stiff competition.

If there is any delay in getting the new company going, this would inevitably mean limited stocks of Amigas for dealers. If the dealers can't get hold of the machines, they can't sell them. I'll leave it to your imagination to work out what that means.

The real strength of the Amiga lies in its dedicated users. That's you lot, in case you hadn't realised it. In the face of dodgy marketing and rather iffy distribution, the Amiga has continued to go from strength to strength. Unfortunately, once again, it's a question of "wait and see" what the next couple of months could bring us.

COMMODORE UK CLOSE TO BUYING OUT THE AMIGA

Management buy-out close to success – new stocks of machines in the shops for Christmas?

Commodore UK are close to buying out the remains of Commodore International. Although no deal has yet been finalised, it seems likely that the liquidator will accept a bid to buy out the company headed by UK Managing Directors David Pleasance and Colin Proudfoot. Two "senior executives" of Commodore International (one of whom is thought to be Lew Eggebrecht) are also involved in the proposed deal.

In a letter sent to all Amiga dealers in early August, David Pleasance said: "There are a number of bids in place for various combinations of the assets. Colin Proudfoot and I, along with two senior executives of Commodore International (but not Medhi Ali) have made a bid, which, if successful, will give us the rights to manufacture, sell, and market the whole range of commodore products, past, present and future, on a world wide basis... We have raised the necessary finance and believe that we will be successful in our purchase of the business... Our budgets do include a significant level of advertising spend, which we will use to the very best effect".



David Pleasance – "The Amiga CD32, Amiga 1200 Amiga 4000 and CD1200 will be produced and sold during the Christmas period..."

"The Amiga CD32, Amiga 1200 Amiga 4000 and CD1200 will be produced and sold during the Christmas period... Thank you for your highly valued support, without which we would not have a business worth fighting for."

David Pleasance was in the US finalising some aspects of the bid when we tried to contact him, but company spokeswoman Dawn Levack confirmed that the bid was proceeding apace, and that Commodore were extremely confident. "It's all tickety boo", she said. "Things are moving along nicely. Morale is very high here."

Although the new company would probably be based in the Maidenhead offices of Commodore UK, it seems likely that the Research and Development arm of Commodore would remain in the US. Despite recent staff losses (such as Jeff Porter and Dave Haynie, as reported in last month's *Amiga Shopper*), there are still 20 engineers working for the remains of Commodore, and they are now located in a new site in Norristown, close to the old offices of Commodore International. It isn't clear what these engineers are working on, but having a team such as this already in place means that new models of Amiga could be designed and produced much quicker.

It also appears that Lew Eggebrecht, the widely respected Vice President of Engineering of Commodore International is still involved with the company, and with the proposed management buy-out.. Although we were unable to contact him at the time of going to press, we were able to confirm that he is still working for Commodore, and is located at the new offices in Norristown.

Although it looks as though we are approaching an endgame in the Commodore saga, the process is not yet complete, and there are still details to be finalised. A final decision is not expected until late August, leaving very little time to start producing machines for the busy Christmas season.

AN AMIGA FOR XMAS?

One thing is extremely important for whoever buys Commodore – getting Amigas into the shops for the Christmas season. Existing stocks held by distributors are likely to run out within the next few weeks. Many dealers have already decided to no longer stock Amigas, including several prominent high-street store chains

In his letter to the dealers, David Pleasance says that "if all goes according to schedule, we will be delivering products (to retailers), around the first week of November". Commodore UK have also been talking to the prominent retailers. This doesn't leave much time – if there's any further delay, we could be facing the very worrying prospect of a Christmas without any new Amigas available. This would seriously affect the cashflow of the new Commodore.

CREDITORS STALL BUY-OUT

One of the main obstacles to reaching a deal for the remains of Commodore International has been that the creditors of the company have not been overly happy about some aspects of the liquidation and the proposed deals.

The creditors (who include Prudential Life Insurance of America, Anchor National Life Insurance and the Korean Daewoo Corporation) have been unhappy about the fact that the liquidation is taking place in the Bahamas. Bahamian law means that the creditors of the liquidated company only have an advisory role.

If the liquidation had taken place in the US, they would have been much more involved in the process of selling off the assets of the company, and the creditors did try to get the liquidation proceedings moved to the US, although this did not succeed.

Commodore International owed in the region of $145 million US dollars at the time it was wound up, $45 million of which was owed to the three main creditors named above.

The reticence of the creditors to accept any deals prompted one wit on CiX to comment that unless they stopped holding up the process, the nearest you are likely to get to a AAA Amiga would be to take out a policy with the Prudential.

CD Pirates up before M'Lud

The Manchester Police and ELSPA (European Leisure Software Publishers Association) have raided two addresses in Manchester and seized what they claim is a pirate CD manufacturing operation. The people running the plant were allegedly copying commercial programs onto Recordable CDs and then selling these. ELSPA claim that the software seized had an estimated value of £500,000. According to ELSPA, a "Man is helping Police with their enquiries into the illegal manufacture and distribution of copyrighted and obscene material."

There was also a quantity of pornography included on some of the disks. According to Detective Sergeant John Ashley of Greater Manchester Police Obscene publications department: "Pornographers are also using this method (CD-ROMs) of distribution for both still and moving obscene images". No prosecutions have yet been brought in this particular case, but both ELSPA and the Police are hopeful of a positive outcome, and are examining the possibility of further raids on suspected pirates.

In another piracy case, a company director has recently been sent to jail for fraudulently manufacturing counterfeit computer software. Mr David Boyle, a director of AMD systems of Bicester, was sentenced to six months imprisonment, as well as having to pay court costs of around £5,000. The Judge commented when sentencing Boyle that this "amounts to a fairly substantial and significant piece of commercial dishonesty and fraud... Because this kind of thing is really fairly prevalent and is difficult to combat, it must be seen that people who do it suffer when they have done it".

METROGRAFX POISED FOR EUROPEAN ASSAULT

Metrografx, the USA-based makers of *Sparks*, have just completed a new range of plug-in products for *LightWave* and are searching for a UK distributor. *Sparks* (a powerful particle animation system) has already been met with success in the States and is reviewed in this issue's edition of *Window Shopper* (turn to page 36–37).

The company's other products include their *Motion Master* collections. These products contain several tools for *LightWave*-users, we've received late Beta copies of some of these programs so we will give a quick rundown on what they can do.

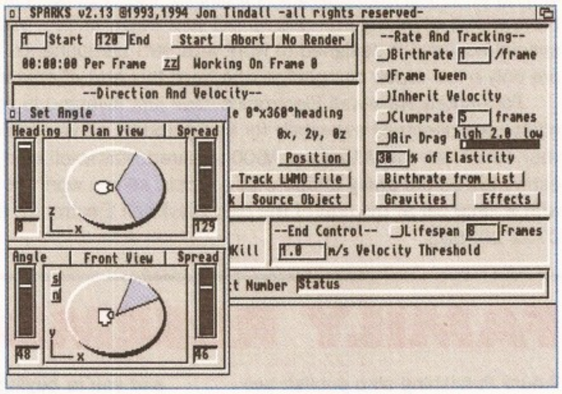
TimeMachine is one of the most powerful tools. It's a time-line editor for managing up to 16 channels of target objects for morphs. It can also be used to synchronise sound events to animations.

Extract is a sound specific tool that can be used to extract amplitude data (ie. volume) from audio samples. Once this information has been extracted it can then be saved out as an envelope or a motion file. If you save an envelope you could easily apply it to a light, the light would then fade and brighten in response to the changes in the sample.

An even more powerful application would be to use the envelopes in conjunction with *Humanoid's* phonemes to simulate speech.

LightningBug can be used with *Sparks* to create amazing effects. You can use *Sparks* to create a scene file with several objects positioned at the vertices of a source object. You could then use LightningBug to replace these with lights.

For information on Metrografx's products call them on ☎ 0101 810 693 5134.



Sparks has been a success in the States – see page 36.

FUTURE ENTERTAINMENTS

There's going to be a hot time in the town tonight. Or in Earls Court 2 between the 26th and 30th of October anyway, because that's when the Future Entertainment Show will be coming to town. All manner of wonderful things will be there, including a special area dedicated to the Amiga, with the chance to try out many new bits of hardware and software. If you are that way inclined, there will also be plenty of games type things, including the chance to try out some of those new fangled CD machines.

The throbbing heart of this event will be the Amiga theatre, where we will be running a variety of seminars. Although the precise details have not been finalised at the time of going to press, there will be seminars on subjects such as Video, 3D graphics and multimedia.

Plus, you will have the chance to meet the staff of both *Amiga Shopper* and our sister magazine *Amiga Format*, and the staff of all the other Future Publishing computer magazines. A number of technical question and answer sessions will also be running, so you can bring along all of those awkward problems and see if we really know what we are talking about.

We will also be running a number of competitions at the show, with a range of stunning prizes. Full details on the seminar schedule and the competitions next month. Tickets are available on the ticket hotline on ☎ 0369 4235 for a reduced price of £6. If you buy more than 10, then each ticket will only cost £5.



When we said...

That last month's video cards round-up was written by John Kennedy, what we really meant was that the Picasso II review was written by ace Amiga programmer Eddy Carroll. Apologies to Eddy for not crediting him for his excellent contribution.

Get safe with your VDU

The Health and Safety executive have produced a handy guide for how to ensure that your computer setup complies with the current health and safety legislation. It covers points such as how to safely use VDUs, how to assess any risks in your current setup and how to plan any new setups you may be installing. It's available from Dillons bookstores or direct from the HSE on ☎ 0787 881165.

Communications breakdown

Following hot on the heels of last month's review, Eureka have announced the impending launch of the *Communicator II*, which will have several new features and improvements in the software. The AGA viewer is now faster, there is a new improved menu system and an automatic test procedure has been added to the software, claim the German manufacturers. An upgrade for *Communicator* owners is available from dealers. Eureka are on ☎ 010 31 463 70800. The UK Distributor of the Communicator is Meridian on ☎ 081 543 3500.

Speedy Comms

Siren Software have announced that they are now selling the Speedcom range of modems. These modems are attractively priced at £229.99 for the V.Fast model and £179.99 for the V.32Bis one, although they are not BABT approved. Siren are on ☎ 061 724 7572.

Germanic Exhibits

Several German Amiga companies are getting together to run a stand at the PhotoKina 94 exhibition, to be held in Cologne from 22nd to the 27th of September. Those exhibiting include *ProDAD* (programmers of *ClariSSA* and *Adorage*) and Electronic Design, who manufacture genlocks and digitisers. Electronic Design are on ☎ 010 49 89 354 53 03.

TypeSmith 2.5

As well as the impending launch of *Pagestream 3*, Soft Logik will be releasing version 2.5 of their font manipulation program *TypeSmith* shortly. This new version can now load and save fonts in TrueType, Postscript, Compugraphic, Intellifont and IFF formats, and also has a selection of new batch processing ARexx commands. The program will cost $199.95 (around £140), but owners of previous versions can upgrade for $40 (around £25) direct from Soft Logik, who are on ☎ 0101 314 894 8608.

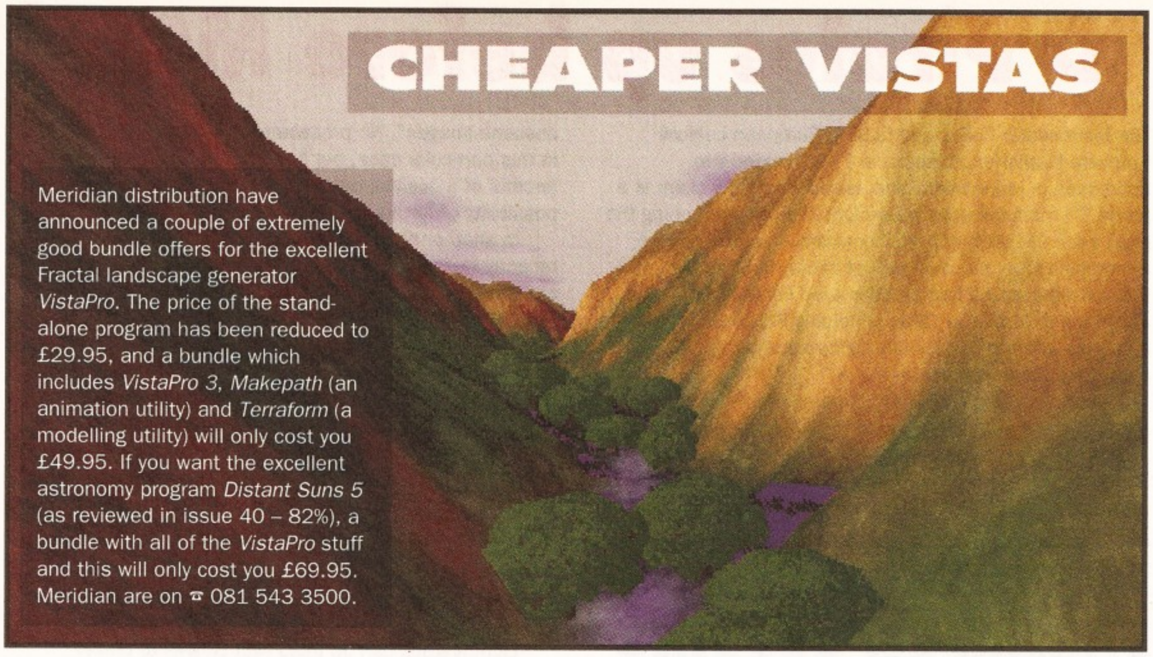
Smarter Pricing

Chroma Computer Images have changed the price of their beginners' paint package *Smartypaints*. The program was previously available by mail order only for £28.50 plus £1.50 P&P, but it's now available through computer dealers for £29.99. For those of you without any gift for numbers, this means that the price has fallen by 1p. Hurrah! They are also looking for new programs to market, so if you've written any good programs recently, give them a yell. Chroma Computer Images are on ☎ 0328 862693.

Further Upper

The rather good disk-recovery and repair program Upper disk tolls has been upgraded to version 1.01 by means of a freely distributable patch. It should be available on a BBS near you soon. The publishers (Wheelbarrow Software Ltd) can be contacted at the Internet address of wbsl@cix.compulink.co.uk or the Fidonet address of 2:252/309.20

CHEAPER VISTAS



Meridian distribution have announced a couple of extremely good bundle offers for the excellent Fractal landscape generator *VistaPro*. The price of the stand-alone program has been reduced to £29.95, and a bundle which includes *VistaPro 3*, *Makepath* (an animation utility) and *Terraform* (a modelling utility) will only cost you £49.95. If you want the excellent astronomy program *Distant Suns 5* (as reviewed in issue 40 – 82%), a bundle with all of the *VistaPro* stuff and this will only cost you £69.95. Meridian are on ☎ 081 543 3500.

Bust machines get better

Although Surface Mount Technology (SMT) makes manufacturing machines cheaper and more reliable, it's a bit of a pain when it comes to repairing them as all of these components are soldered directly on to the motherboard in a special way. You can't just wade in there with a soldering iron and rip out your dodgy chips – you need special equipment designed to work with SMT components, and there are only a few repair companies who have this sort of equipment.

Fortunately Hawkwell Electronics have just invested in some new equipment designed especially for this purpose, so you can now get your out-of-warranty A1200 or A600 repaired. Hawkwell also give free estimates before going ahead with a repair, so you won't be landed with a large bill at the end of the day. Hawkwell Electronics are on ☎ 0702 207593.

How to get into FES for absolutely nothing

We have 10 tickets to the Future Entertainment Show to give away. All you need to do is to tell us which famous playwright told a US customs officer "I have nothing to declare except my genius".

Send your entries to:

The Oscar Wilde Competition
Amiga Shopper
30 Monmouth St, Bath, Avon BA1 2BW

FAMILY RESEMBLANCE

Future Publishing also publish two other excellent Amiga magazines – *Amiga Format* and *Amiga Power*. Here are the editors to give you a quick rundown on what's in this month's issues.

"This month's stunning cover is merely a taster of the equally stunning contents. The theme of the issue is Desk Top Publishing; buy *AF* and you're buying into the world of electronic page make-up, with £100 worth of *PageSetter 2* on the coverdisk, detailed instructions on how to use it and a seven-page feature on the ins and outs of Amiga DTP.



Not content with that, we also have one or two *AF* exclusives, such as the definitive review of the awesome Warp Engine accelerator card for the A4000 and the world's first review of *Bullfrog's Theme Park* (we actually review the Amiga game, rather than the PC version!).

Chuck in an extensive round-up of A1200 accelerator cards and a preview of the unbundled version of *Lightwave* and you have one totally bitchin' mag. Er... dudes." – Steve Jarrat, Editor of *Amiga Format*

"A new platform game that's worth 91%? Yes, indeed. But not only does the September issue of *Amiga Power tell* you why *Putty Squad* gets such a massively high score, it also lets you find out why for yourself via an excellent 8-level demo.

Also on our coverdisks are an



exclusive demo of Empire Soccer (which we gave 90% last month) and a couple of the finest PD games you'll ever play.

Inside the magazine itself are reviews of *Kings Quest 6*, *Kid Chaos*, *Universe*, *Ishar 3*, and the surprisingly good *On the Ball*, along with your chance to vote in our readers' All-Time Top 100 Amiga Games. Plus! We ask: what would games be like if the Amiga had been invented in 1972?" – Jonathan Davies, Editor of *Amiga Power*



The latest news from R Shamms Mortier – our man in the US.

Bernoulli's

One of the nicest add-ons that I've purchased in years has been the Iomega Bernoulli removable-media drive from Cedar Company. The company runs a good number of promotional sales that offer the 150meg disks at very fair prices. Through September they offer a five disk package for the price of four,.. about $400.00. Unlike other removable media I've tried, this drive offers no resistance to Amiga use. The installation procedure for Amiga users is not documented, but here's how simple it is.

Connect the drive to your SCSI port. Put a disk in until it clicks, and it's icon appears on screen. Now go to the Amiga HDToolBox located in your Tools directory and create one large drive partition on the disk. If you leave all of the disks you use named the same, you'll easily be able to include the Bernoulli in your networking operations. I've also discovered that you must make sure a disk is in this drive when you boot the system

HYPERCACHE

Hypercache is a utility from SPS Software that allows you to utilise dedicated operations that would normally make calls to the hard drive and instead place them in RAM, where speed increases would be noticeable. Hypercache (pronounced "HyperCash") makes the computer think it's another hard drive.

The more RAM you have, the better Hypercache will work. The 2.0 upgrade is available for $19.95 (plus a $5.00 P&P fee for overseas orders). Retail price is $59.95. The 2.0 version offers an Installer based automated setup, AmigaGuide help, a revised and expanded manual, and WBench style interface with a control panel look. Where are they going?

Don't think that all of the folks released by NewTek and Commodore are just sitting around waiting for things to happen. Many are already firmly attached to other companies. Dave Haynie, for instance, the former senior systems design engineer for CBM has joined the SCALA team. SCALA's business is exploding, and they are becoming a major force in the multimedia and information highway marketplace. If the Amiga comes back on line, they'll continue to use it for their platform. If not, they have other plans in process.

What about a number of the folks that were "downsized" from NewTek recently? Many are heading to another well known Amiga development company whose identity I am prevented from divulging. Their new tasks will not involve Amiga development at this time, but extensive work on a unique video unit for another platform.

Panorama 4.0

Panorama 4.0 is set for release in the Fall. The 3.0 version was skipped altogether due to some legal entanglements. New features include support for Retina, OpalVision, Picasso, and enhanced support for AGA resolutions. Upgrade cost will be $30.00 with a $80.00 fee for new users. The biggest addition will be a conversion program that will read the freely available USGS Digital Elevation Model format, which means that it will be far less expensive for the user to collect a massive library of geographical locations throughout the world (and other planets as well) to render and animate! AmiGadget Publishing PO Box 1696, Lexington, S.C. 29071 USA ☎ 0101 803 957 1106



PARTING IS SUCH BITTER SORROW

Central Coast and New Horizons Software, have gone bankrupt and are out of business. That means that whatever version of Quarterback or QuarterbackTools you have at the moment is your last, unless another developer picks up the packages.

The Big Secret

I've been an Amiga reporter for a long time, and I can usually waggle any secret out of a developer. But with Innovision, the developers responsible for the *EN-LAN-DFS* networking software and other networking packages, I'm batting zero. All that I know is that they are about to announce a major new product release for LightWave in the next month, and that it will sell for about $225.00.

On another front, I've been BETA testing InterWork's new ToasterNet software. TNet works in conjunction with the ENLAN-DFS networking package and allows you to do what is called "distributive rendering" on a string of connected Amigas.

Even the BETA version seems to be flawless. It allows things like loading a scene and having separate Amigas rendering specific frames all at the same time. When the fastest Amiga is done rendering one frame, it takes another, with no wait time. TNet also allows batch rendering of frames in the que list. With the release of the standalone LightWaves, all of this becomes very important. I will do a full review on this software for a coming *Amiga Shopper* issue – don't miss it!

TALON BOARD

I recently spoke with Jerry Pruden, the manager of DKB. DKB is in the last stages of preparing to market another Amiga 24bit board, the Talon. Jerry said that the Talon would feature the new Cyrex graphics chips, which produce the cleanest 800 x 600 resolution around. They're also looking for a suitable paint package to bundle with the board (AlphaPaint, TVPaint, and Brilliance are possibilities), and are hot on the trail of various 3D packages willing to support Talon rendering.

The board will run on all Zorro-II and III machines (like the A2000 as well as the AGA's). The initial suggested retail price will be around $450.00, with another $150.00 charge if you desire a video option that allows a composite and Y/C out.

What else is DKB working on? How about a new line of 68060 accelerator boards. Better yet, how about AGA emulator boards for non-AGA machines. All that's really needed in the second case is for the supply lines for the right chips to be opened again.

Diemer Sequel

Diemer Development's "Sequel" MIDI editing software has just been upgraded to version 1.3. Enhancements include new MIDI and Amiga "Thru" features, a new Chop panel for cutting out unwanted parts of a song, and new track-saving features that address Sequel song patterns.

Electronic Arts

Watch for EA to release a true 24-bit paint program in the autumn. It's no secret that several of the developers who worked on Digital Creation's *Brilliance* made their way to join Electronic Arts towards the end of the development of *Brilliance*. What secrets and skills they brought with them is anyone's conjecture, but they were reportedly welcomed with open arms. By the way, registered users of *DPaint 4.6* can get a free upgrade to 4.6.1. That will fix the inability of 4.6 to get fonts from alternate directories. Electronic Arts ☎ 0101 800 245 4525.

Centaur better



Centaur claim that their OpalVision Video modules are even better than advertised.

The OpalVision Video Processor module is now almost shipping, with advance orders being taken for the first batch. $995.00 U.S. funds, with a special $695.00 price for those who hold the advance special coupons distributed some months ago. Centaur promises that at this stage they're not about to pull out of the Amiga, and that the new video modules are twice what was promised in the original ads.Centaur Development 2645 Maricopa St.Torrence, CA 90503 USA ☎ 0101 310 542 2292, FAX: 0101 310 542-9998

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Your favourite magazines come to life...



The World of Amiga

Welcome to The World of Amiga – a whole show in itself, this is the place where you'll be able to see everything that's new and exciting for the Amiga, still Britain's liveliest home computer. Developments in CD-ROM, FMV, graphics, games and more will be there for you to see and try, and you can buy the biggest Amiga bargains too!



Amiga Theatre

The Amiga Theatre will be the focus for all things Amiga: run by Amiga Format editor Steve Jarratt, with contributions from the eds of Amiga Power and Amiga Shopper. It will be the place where you can meet and quiz the experts such as magazine writers, software developers, technical gurus, and the people who are deciding the future of the Amiga. You'll be able to learn, take part, ask questions - get involved!



The Future Music Feature

Come to The Future Music Feature – discover the amazing world of modern music, and find out how you can make music for yourself without having to spend a fortune or take years learning to play. Music is one of the most exciting areas of computer use, but so few people get involved: we can show you how! And if you're a musician already, we'll have all the most exciting new kit lined up for you to try, and lots of experts on hand to help you explore new ideas!



CD-ROM Today Area

Don't miss the CD-ROM Today Area, where you'll be able to see everything that's new on compact disc – currently the most exciting area of leisure computing. See and try the latest games, edutainment and multimedia products on disc, perhaps buy a CD-ROM drive or multimedia expansion for your computer from the many dealers at the Show and get a taste of the future with MPEG, FMV and more.

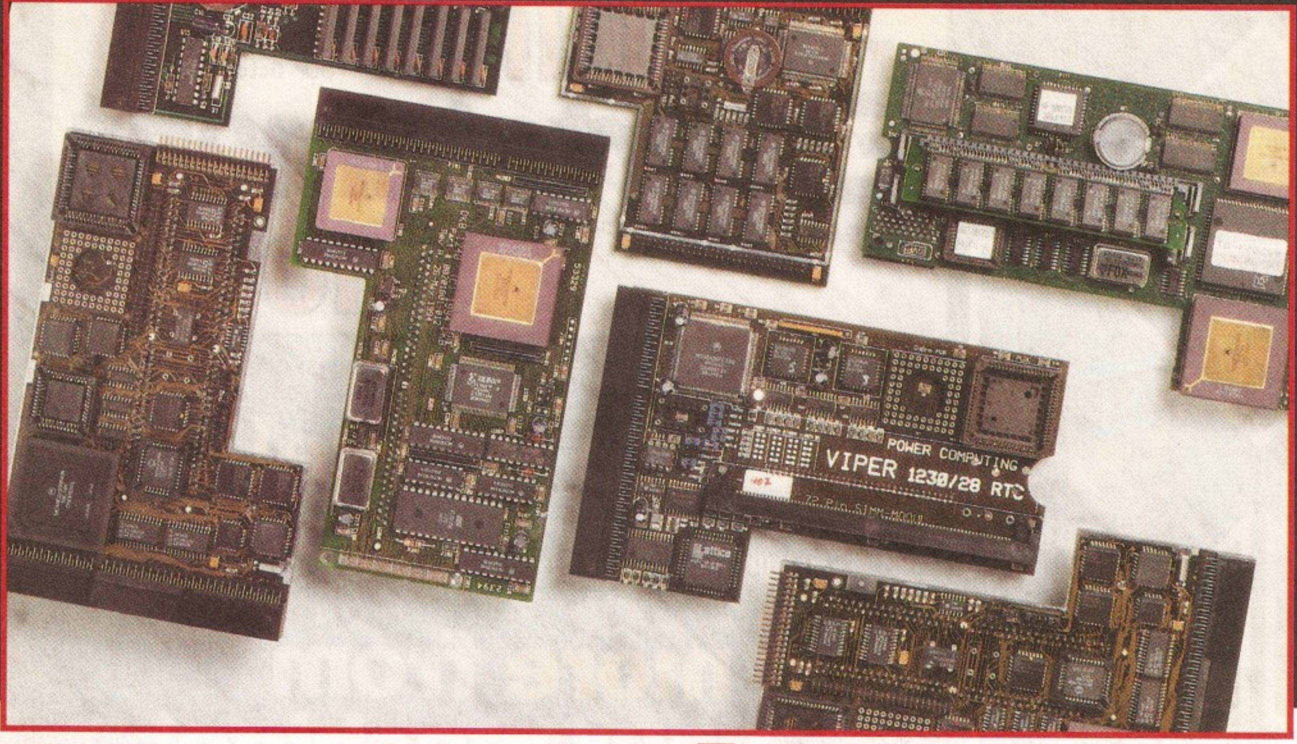
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Imagine



Want more speed from your A1200? Mark Smiddy examines a bunch of the very latest turbo-charged offerings.

Ace Accelerators

When dinosaurs ruled the earth, high-speed reactions were not something you could take for granted. The nervous system of a Brontosaurus was so simplistic it could take more than a second for a sensory input to travel from its tail to its brain. Notwithstanding the extinction of these gentle giants, it seems unlikely they would have survived the evolution of faster reacting organisms – humans for instance.

Even today, the quest for absolute speed continues, and anything that can't keep up falls by the wayside. Darwin called it "survival of the fittest", computer scientists call it "progress". But there's an interesting side-effect in operation here. Computers were invented to solve complex mathematical problems and perform repetitive tasks. But, surprisingly, many modern micros are less well suited to these jobs than some might suggest. In fact, the major driving force behind the drive for more speed has recently been recognised as the games industry.

Even the most powerful super computers on the planet, such as the Cray YMP, spend most of their CPU time dedicated to playing games! To be fair, games at this level are more accurately termed "life simulations" but in reality, they're just games with less mindless applications. Engineers now use flight simulators to train airline pilots and driving simulators to test new automobile designs before anyone lifts a finger on the shop floor.

By extending this games theory to encompass general entertainment, you can also include computer graphics – a revolution for the motion picture industry. From the basics like *Babylon 5* which uses an Amiga with a Video Toaster, to the big-budget films such as *Terminator 2* with its award winning special effects created on a desktop Silicon Graphics workstations.

But it doesn't stop there – following Brandon Lee's tragic death on the set of *The Crow*, movie makers employed computer graphics to finish several scenes where Lee's face was matted on to a body double. Amigas were also used during the early development of the stunning computer generated dinosaurs on *Jurassic Park*.

Keeping things in perspective, let's not forget the Amiga is a home computer – a micro in the truest sense and the fact the machine even gets a look in against SGI and Sun Workstations must be some testament to its power and versatility. The A1200 is a fast machine, but the thirst for speed is unquenchable. While many applications run comfortably with the base configuration a great number of newer ones benefit greatly from the extra speed offered by later processors, additional 32-bit RAM and even FPUs. Floating point units have been found to increase the average overall speed of complex maths by almost 70 times normal (GVP A1230) and an average speed of increase of over five times for normal operations.

PROCESSORS AND SPEED

Three processors are employed by the accelerators featured in this article: the 68020; 68EC030; and the 68030. There is a great deal of confusion about these processors and the differences between them. In essence, the 68030 are faster engines than the 68000 they replace thanks to the fact that they can run at higher speeds and the inclusion of instruction and data caches. A cache is a small area of memory inside the processor that can be loaded with instructions (or data) and accessed directly without having to go through some electronic middle men to the RAM chips.

The 68030 also has a memory management unit (MMU) that can perform a variety of functions but it's most useful is to alter the physical address of some part of memory. (It's as if someone uprooted your house and moved it to the other end of the street.) This also allows those with packs of money and large hard drives to use GigaMem virtual memory. The 68EC030 does not have an MMU function and so costs less.

MMUs have two primary functions in Amiga systems. First, they can re-map the ROM space into RAM – so Kickstart can be loaded into RAM and run from there. Second, they can be employed by some powerful debugging tools such as Enforcer. Very few users will get any use from Enforcer and the remapping of Kickstart can be done in software so the MMU is hardly necessary.

Interestingly enough, none of the boards tested claimed to support SCRAM (Static Column RAM) – which is odd considering that could put them way in the lead, albeit at greater expense. I suspect that the GVP does use SCRAM but I have been unable to verify this at the time of writing. Curiously though, attempting to use Burst (SCRAM cache load) with conventional RAM created a significant decrease in RAM access speed. Something to watch out for if you decided to fiddle with AIBB or the CPU command. See the box headed "what about RAM?" for more details.

Processor speed is an important consideration. For starters don't think that adding a 50MHz 68030 is going to affect the AGA chips, it isn't. Although you will see an increase in speed, that is due to the native processing speed of the replacement CPU – anything handed over to CHIP RAM must run at the speed of the existing bus, 14MHz in this case. For this speed to affect your software, it must be loaded and running in the Fast RAM addressed by the replacement processor.

As an interesting aside to this – don't be tempted to replace the master crystal in your accelerator's board; or the FPU crystal with a faster one. In theory, you can clock a processor up to an infinite speed, but in practice the semiconductor junctions develop little capacitors and begin to suffer from odd pathologies such as Miller effect and capacitive loading. To put it in layamans terms, they stop working properly and you stand a good

chance of knackering your CPU. Fast processors are designed to run at those sort of speeds – so the designers manufacture the transistors to work at those speeds. "The light that burns twice as bright, burns half as long." If you need a faster processor, buy a faster board.

TURBOTECH A41200

Siren Software

TurboTech's offering is by far the cheapest of those on display here and Amiga Shopper was the first to glimpse at an early production prototype of the shape of things to come. The board was so new, at the time of writing, the packaging hadn't even been finished and some layout errors were still being patched by links over the base of the hand-built board. Of course, the real ones won't have that, will they?

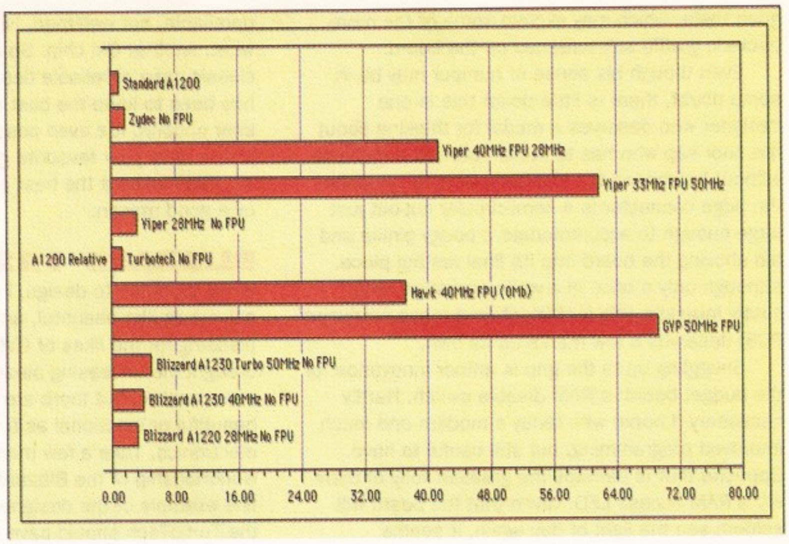
As expansions go, this one represents all that is cheap – but not necessarily nasty. In its current incarnation, expansion is fixed at a minimalistic 4M of soldered ZIPs – no sockets and nowhere to fit more. Address decoding is accomplished by a triplet of GALs plus some discrete logic to hold it all together.

The quintessential RTC (Real Time Clock) is based around a classic Oki chip driven by a standard 3V lithium cell, also soldered on the board. The life-expectancy of such a device is likely to be less than three years, after which time it's going to be out with a soldering iron and a Maplin catalogue or back to Siren for a replacement.

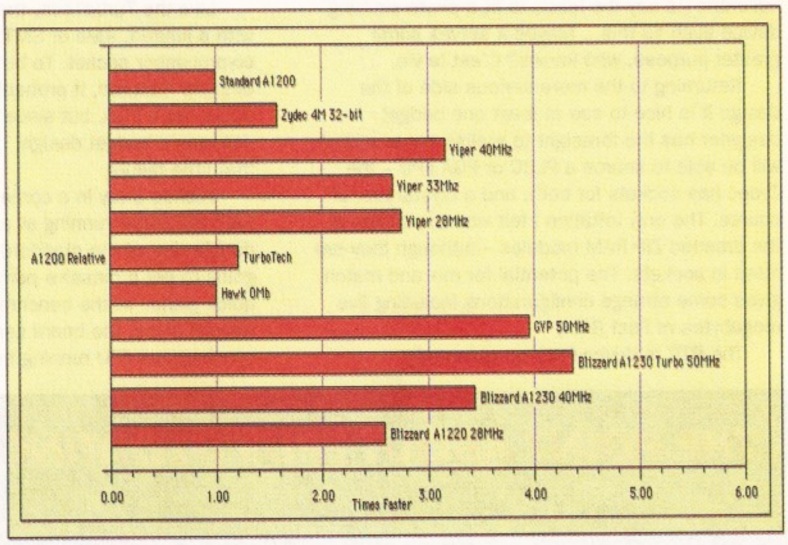
No provision has been made for a second processor, FPU or anything else for that matter. A quick survey of the board also suggests it is unlikely the current batch will ever be fitted with sockets for the dreaded ZIPs. The zero wait state design returned unspectacular results across the board with the only surprise being a slight improvement in floating point maths. Theory suggests this is probably due to the standard library being loaded into Fast memory.

Overall, a great choice if you need to do things on the cheap – but there's no room to manoeuvre at a later date should you decide to upgrade. Ease of fitting was a major bonus on this board.

This chart shows the amazing increase in speed achieved using a simple maths co-processor. Performance increases of 70 times normal are not unusual with the better engines. All FPUs were 68882 PLCC or PGA types.



As usual manufacturers' claims do not live up to expectations. On average, few boards came close to even four times normal speed. Nevertheless, there are massive improvements on the standard machine!



AMITEK HAWK

Silica

The most striking initial appearance of the Hawk is the livid cardinal red assaulting your eyes as you tear away at the plastic insert. This curious choice of colour has nothing to do with the function of the board, but it does suggest someone wasn't thinking when the material was picked. Or perhaps they were just in a funny mood.

Like the TurboTech, this one is firmly aimed at the budget end of the A1200 market; unlike the TurboTech, I am forced to report, the designer actually thought about what people might really want in a cheap expansion. Those few extra pennies left me in no doubt on which I would choose from the budget range.

AmiTek has (like many others) plumped for a single SIMM expansion giving the option of 1, 2, 4 or 8M in a single step. Something that may be a cause of concern if you suddenly find the 1M SIMM insufficient and want to unload it on some other poor sap. 4M would be a better choice to start out with since at least some boards can use these in a second free slot.

The RTC module formed around that ubiquitous little Oki module is again driven from a lithium cell, but unlike the TurboTech this one is in a socket. When the battery wears out, you can just nip and get a replacement from a local Dixons or Tandy. The designer had his thinking cap on with this board's expansion options too. Users have the option of fitting a 68881/2 into the PLCC socket provided and running it at either the Amiga's synchronous clock, or at a much higher asynchronous clock with an optional crystal.

There is one major flaw with this board though, and one which I hope to see put right as a matter of urgency. Once installed on a standard machine, at least three (and possibly more) soldered joints get perilously close to the internal shield. You don't have to be an electronics genius to spot the danger there. A spot of masking tape or a bit of old chewing gum on the shield should be sufficient to prevent an unfortunate mishap there. Overall though, a competent board let down by a basic design flaw.

ZYDEC A1200 RAM EXPANSION

Evesham Micros

Studying this board for what seems to be the fiftieth time in four days, makes me wonder if the whole of the British PCB manufacturing industry has an extremely strange obsession with carmine. The designer of this board clearly has a sense of humour, a yen for The Simpsons, and a lack of

JARGON BUSTING

CPU – Central Processing Unit. The brains of your computer – the 68020 in an A1200 or 68040 in the A4000/040.

FPU – Floating Point Unit. Hardware handling the calculation of complex maths.

MMU – Memory Management Unit. Device for moving and monitoring physical address space.

PGA (1) – Pin Grid Array. A socket for complex VLSI chips such as FPUs and high-performance CPUs. Chips configured for PGA use have several rows of pins extruded beneath the chip.

PGA (2) – Programmable Gate Array. By an unfortunate co-incidence, PGA also means Pin Grid Array – and the two can be easily confused.

PLCC – Plastic Leaded Chip Carrier. A socket commonly used for complex VLSI chips.

SMD – See SMT.

SMT – Surface Mount Technology. A modern method for mounting integrated circuits on circuit boards where limited space and high-speed are prime considerations. SMT chips are often called SMD's.

VLSI – Very Large Scale Integration. Typically, more than one million transistors on a single chunk of semiconductor.

good taste, which may explain some of the more esoteric graffiti silk-screened on the board.

Even though his sense of humour may be in some doubt, there is little doubt this is one designer who deserves a medal for thinking about the poor sap who has to fit his board to a machine without butchering the warranty. Directly opposite the edge connector is a semi-circular cut-out just large enough to accommodate a podgy pinkie and aid shoving the board into its final resting place. Although only a once in a while operation, this costly foresight (it's inefficient on a mass produced PCB) deserves a few marks on its own.

Snuggling up to the grip is anther innovation for the budget board: a RAM disable switch. Hardly necessary (I hope) with today's modern and much improved programming, but still useful to have. Opposite that is perhaps the greatest folly of them all: a RAM access LED. Given that the board will seldom see the light of day again, it seems eccentric (to say the least) to fit a photo-emitting device such as this... Maybe it serves some greater purpose, who knows? C'est la vie.

Returning to the more serious side of the design it is nice to see at least one budget designer has the foresight to realise not everyone will be able to source a PLCC or PGA FPU – the Zydec has sockets for both; and a crystal too, of course. The only irritation I felt was the choice of the dreaded ZIP RAM modules – although they are fitted in sockets. The potential for mix and match gives some strange configurations including five megabytes of Fast RAM.

The RTC is driven from an potentially unreliable, but well-tried, NiCad battery, with, guess what, another Oki chip. So all in all, this is a classic case of reliable design where the option has been to keep the cost down without sacrificing user options. It's even possible to disable the FPU just in case your favourite games won't run. All in all, this makes it the best of the budget RAM bunch by a good margin.

BLIZZARD 1220/4

When it comes to design, I usually reserve adjectives like beautiful, artistic and aesthetically pleasing for the likes of GVP, whose designs have brought me unceasing pleasure over the years. Call me eccentric, but there are few things quite as beautiful or functional as a well-designed piece of electronics. Take a few moments to study the workmanship of the Blizzard board and you'll see a fine example of the designer's art. It's everything the TurboTech should have been and wasn't.

Like the TurboTech, the little Blizzard is fitted with a limited, 4Mb of SMT RAM and optional PLCC co-processor socket. To be fair to the other designs featured, it probably should have had the option for a PGA, but since this is ostensibly the rich-man's budget design, I'm prepared to forgive it that little failure.

Tucked away in a corner of the board is a little SMT 68EC020 running at a miserly 28MHz – double that of the standard machine, so you're not going to get a massive performance increase; a quick glance at the benchmarks will tell you that. Nevertheless, the board can also carry a synchronous FPU running from the internal 14MHz clock; on-board 28MHz clock or an external module at up to 40Mhz.

An interesting option for this board is an extra 4Mb expansion – utilising a non-standard connector. It's a shame that Phase 5 didn't just fit a standard 72 pin SIMM connector as they have with later (more costly designs). A second detractor is that little SMT lithium battery – the folly of which has already been explained; it's worse here though because working on SMT PCBs is a specialist art requiring unusual and hideously expensive soldering equipment.

Overall, though this is the best of the budget/medium price range by a long chalk.

VIPER 1230/28

Power Computing

Hot on the heels of the Blizzard board for artistic appeal come the Power Computing Vipers. The MkI version supplied is a bit of mix an match using a combination of through-mounted and SMT components. Detracting from an otherwise capable design are a little bank of configuration "jumpers". Jumpers are difficult to handle even for nimble fingers with a pair of long-nose pliers, and packed as tight as they are on this early revision makes them difficult to access. Thankfully, its the sort of job you only need to do once. Like the Zydec, the Viper MkI includes a cut-out to ease installation and the choice of PLCC and PGA FPU sockets.

Documentation supplied with the review sample was sparse and suggests the FPU can run synchronous with the internal clock (14MHz) or the on-board processor clock at twice that. However,



THE POINT ABOUT FPUS (FLOATING POINT UNITS)

Ask yourself, do you really need an FPU? I mention this purely because the vast majority of people who think they need an FPU do not understand what the device even does: apart from perhaps understanding that it performs some complex mathematics. Consider the following sum for a moment:

2 + 2 = ?

Even a child of five could tell you the answer to that one. OK, what about this:

2.5 + 2.5 = ?

Nothing too tricky here – or is there? The second sum (you know instinctively that the answer is five) is a fixed point calculation. Expressing this in terms a computer can understand is far more difficult than you might think, though. The simplest method is to apply a large scalar, find the product of each side, add them together and divide the result by the scalar.

The scalar can be any number, but in a computer it would typically be some multiple of two because multiplication and division by some multiple of two (4, 8, 16, etc.) is a simple matter of bit shifting left or right. (You can take it for granted that shifting is easy.)

We could re-define this sum thus:

[(2.5*32)+(2.5*32)]/32 = ?

Such fixed point arithmetic is fine for simple calculations, but things start to get messy when transcendental maths is added to the equation (if you'll pardon the appaling pun).

This means things like sines, cosines, natural and exponential logarithms: the sort of things you take for granted on a scientific calculator. For instance a function such as...

X=SIN(RAD(a))*COS(RAD(b))

...is simple enough for a calculator but is a real bind for a computer which is really only designed to handle simple integer maths.

But hang on, isn't a calculator just a computer? Not exactly, the average common-or-classroom pocket scientific calculator is a little miracle with a custom designed processor capable of handling floating point maths. Such maths come into expressions when you need to describe a number with an exponent (10 raised to the power En).

Performing these operations in software is relatively straightforward, but it takes time – a simple multiplication can take several thousand instructions. Even though the CPU can carry out many thousands of instructions in a single second, the degradation in performance is very obvious even to the untrained eye. Programmers often avoid this problem by using integer arithmetic whenever possible and only resort to fixed point when it's unavoidable.

Even so, applications such as Imagine and VistaPro have to use full-blown floating point maths to do their jobs. A very few professional applications like spreadsheets and even page layout programs can use floating point maths for accuracy at the expense of speed.

The solution comes in the form of an adage developed by SGI which goes something like this: "Never do in software for tomorrow, what you can do in hardware today". Motorola and others noted that by designing a processor to handle just floating point maths, the main processor could get on with what it does best – and so the floating point co-processor (FPU) was born.

The really neat thing with co-processors is that they can be made to run asynchronously to the CPU. In other words, the processor can hand a complex calculation to the FPU and let it work on it while the processor carries on working on something else. The FPU can simply interrupt the processor when it finishes the calculation. Think of it as having an assistant you delegate some job to.

In some cases you will reach an impasse where you can't carry on until the assistant completes the job and returns with the results. Therefore, the faster your assistant can work, the less likely you will be left hanging around twiddling your thumbs; or, generating wait states in the case of a CPU.

It is this factor that has allowed designers to make FPUs run at a different speeds to the main bus. For this reason, most of the FPU capable boards featured here have a separate FPU crystal and support many different configurations.

The question remains: do you need one? Well, it's a very sad fact that the vast majority of Amiga applications do not support FPUs. Both *Imagine* and *VistaPro* are available in floating point versions. For the vast majority of users an FPU is a waste of time: a useless appendage.

The option to have one is inviting, but think long and hard before you invest a lot of hard-earned dosh in a folly.

there is space to fit an external DIL oscillator module and that seems to suggest the board is capable of more.

RAM expansion capability is via a standard 72-pin SIMM socket and is configured for up to 8Mb (a costly exercise, even at that level). Perhaps the most surprising result came from the bench tests where the MkI outperformed its faster cousin (the 33MHz, MkII by a small margin on the integer test. The RTC is powered from a permanently fixed 3V Panasonic lithium cell lending reason to the suspicion that this design may soon be for the clearance pile, superseded by later, and better performing revisions.

While there is no mention of the mysterious expansion mounted underside the board, this is apparently intended for a SCSI 2 expansion. This will allow the use of external hard disks and CD-ROM drive.

VIPER MKII

Power Computing

Less attractive, but better performing, comes the Viper MkII. Like the earlier version, this one uses a combination of through-mount and surface mount components – an odd choice in my book. A welcome relief is the absence of the dreaded jumped block – custom electronics now determine the size of physical RAM fitted to the board. More surprisingly, the Viper MkII supports up to 128M of RAM – but a tentative call to Power suggests that few people would be able to afford such luxury at a cool five grand *(Five grand? That's nearly as much as we're paying you for this article -Ed)*.

There are several points of interest here – at least one of which seems a correction of an earlier mistake; namely that the lithium battery is now housed in a socket for easy replacement. Perhaps more relevant though is the conspicuous absence of a PLCC socket for an FPU – the newer board have space for the PGA versions only.

More curious still, was the anomalous results from the AIBB benchmark analysis, although this did not become entirely clear until the results had been normalised to a standard reference, averaged and tabulated. Nevertheless, if the benchmarks are to be believed, the Viper MkII performs admirably well against the stiff competition from the 40MHz Blizzard card.

Expansion for this board is via an edge connector and it is planned to offer a SCSI 2 upgrade with a claimed transfer rate of up to 10Mb per Second given favourable conditions. The expansion will cost around £70 and should be available by the time you read this, although we were not able to review it.

BLIZZARD A1230

Gordon Harwood Computers

The Blizzard boards are probably the only serious competition to GVP both in high-price and high-performance. In the benchmarks the 50MHz versions of both boards are so close the difference is imperceptible.

These larger brothers to the simple A1220/4, use the same attractive surface mount designs and have the option for either PLCC or PGA FPUs. Rather like the MKI Viper though, manufacturer Phase 5, have opted for a bank of fiddly configuration jumpers – to be fair though, they are more accessible.

Mounted underside the board are twin SIMM banks capable of handling up to 64M RAM in total. A more economically viable option than the single 72-pin job employed on the Viper. On the component side two expansion connectors provide for the forthcoming SCSI 2 interface, but unlike the cheaper Viper, these are proper IDC type pin plugs. There is nothing to fault this excellent and well thought-out design and in the luxury category, the use of industry standard SIMM expansion puts it just ahead of the GVP. On the down side this design uses the solder type lithium cell which may be cause for concern in years to come.

GVP A1230

Once again, GVP takes the design award for technical excellence. Streets ahead of everything but the Blizzards. This board was the easiest to fit when most others were a tight squeeze – some necessitating removal of the floppy drive (a tolerance factor that seems to affect only some machines). Similarly, the performance ratings speak for themselves with the GVP and Blizzard neck and neck with insufficient average difference to separate them in real-world applications.

GVP beat the Blizzard range by a slight margin because they have managed to get all the major components on a single side, including the socketed Lithium cell. Only the Viper MkI comes close in this respect. On the down side, a major failing of this design is GVP's refusal to support industry standard SIMM modules for the expansion. This limits expansion choice to GVP suppliers and will have a tendency to keep the price higher than it otherwise might be.

Another surprising down side to this particular board (and one which I could find no explanation for) was the use of turned pins for the FPU's PGA socket. All other designs employ a proper socket in this position – and even the GVP has one for the PGA CPU. This anomaly could be forgiven if it wasn't for the tendency for the FPU to come loose

What about RAM?

There seems to be some slight confusion surrounding 32-bit and 16-bit RAM. 32-bit refers to the "width" of the data bus: the number of bits of information that can be retrieved from memory in a single chunk (a "fetch" spoken in the lingo).

What you might find a little surprising is the fact that there's nothing particularly special about 32-bit RAM. In older 8-bit systems the RAM was usually organised as eight chips with one bit each for any specific memory address. It follows therefore that a 16-bit data bus uses 16 chips and a 32-bit bus requires 32.

A quick glance at most RAM boards use no more than eight (or at most) 16 chips. This is achieved by making each chip hold two or four bits for every possible address. Multiply the number of bits on each chip by the number of chips and you can determine the width of the bus.

Typical Amiga 1200 expansions use a single SIMM with eight chips organised as four by X megabits of RAM. The distinction between megabits and megabytes is important: by a factor of eight. One megabyte of 32-bit RAM is constructed from eight megabits of RAM; so a 1M, 32-bit SIMM is made from eight 1Mbit SIMMs each organised as 256 addresses of four bits each.

Such SIMMs are now available with up to 128M of RAM – and if you need to ask how much they cost then you can't afford them!

Static Column RAM or SCRAM is a fairly recent development and can only be fitted to processors that support it – the 68020 and above for instance.

Someone noticed that an awful lot of a processor's time is spent accessing sequential addresses. This led to the idea that decoding a separate Row and Column for every single address is nothing short of ludicrous – since the data can be accessed sequentially just by increasing the Row address by one each time. (It's obvious when you think about it.)

So static column RAM was invented and processors were upgraded to use it – on the 68020+ series SCRAM addressing is invoked by setting the BURST mode. The 68020 has an instruction burst only, whereas the 68030 and 68040 have instruction and data burst modes – each independently switchable.

The advantage of this system is because it takes a finite amount of time to latch rows and columns, by holding the column address STATIC and moving just the row, RAM access times are reduced considerably. At the time of writing I have been unable to ascertain which boards could take full advantage of this extended capability.

The access time of any RAM chip – whether it be a SCRAM, SRAM or a DRAM is the maximum time taken from an address appearing on the address bus to data appearing on the data bus. Just to add to the confusion, DRAM chips have a secondary memory cycle time.

In other words, you can't read a bit, then read another bit straight away. A typical 120nS (nano second) Hitachi DRAM, requires a complete memory cycle of 220nS!

Such DRAMs are typically used in the Amiga A500 series, and this leads to some interesting headaches for the designers of accelerated processors. The RAM can't keep up with the processor and you get wait states.

Wait states are one of those nightmarish problems designers always try to avoid. What happens is that the CPU has to wait for the data it has tried to read from the memory to pop up on the data bus, and it will only wait for a certain amount of time.

If the RAM does not respond within that time, the CPU halts external processing and generates "wait states" – sits around twiddling its thumbs. The total normal read/write cycle on the 68000 takes 280nS. But the custom chips steal about half those (when accessing Chip RAM) leaving a total cycle time of 140nS. Clearly DRAM responding in 220nS would be too slow.

Add lots of DMA contention (lots of colours on screen for instance) and the custom chips start to get cycle greedy and pinch extra cycles. This is why Chip RAM is sometimes slightly slower than Fast RAM. Interestingly, an American publication "DTACK Grounded" specialises in cavalier, high speed 680x0 designs in which data is always available when its called for. Ah, the quest for speed goes on...



and fail. While this is unlikely in a home environment, it did give our team cause for certain concern and is something GVP should correct in future revision.

AND THE WINNER IS...

In the budget RAM category, the well-made and confidently thought out Zydec RAM expansion takes the gold award. It isn't going to win any medals for design, but at the price it's hard to see how anyone could go wrong.

Over to the pure accelerators now. There is little to choose between the Blizzard and the GVP, with the GVP just edging ahead on pure aesthetics. The all out winner has to be the Viper series, with a price/performance ratio far exceeding both GVP and Blizzard range. Technically, the Viper boards are less well engineered, but they work more than adequately, and at the end of the day that's what really counts. AS

THE BENCHMARKS

All the bench tests were performed using a standard A1200 with 2Mb CHIP RAM and an internal hard disk. For all these tests Instruction and Data caching were on, Instruction burst was on and Data burst off. It's important not to attach too much weight to individual results since they only give a rough indication of the average speed increase. All the results have been referenced to the standard A1200 configuration with a speed of 1.00.

A board producing an AOA (Averaged Over All) figure of 3.96 will perform normal operations around four times faster than a standard configuration. The figures for floating point maths are quoted separately so you can judge the result of adding an FPU. I should stress, these performance ratings will only be achieved by the limited selection of software that supports hardware floating point units.

Manufacturers are keen to point out the highest possible figure using a standard benchmark, but this is rarely achievable in the real world. Indeed some boards are more sensitive to certain tests than others. For instance, the WritePixel test resulted in around x2 for all boards except the Blizzard which raced ahead with a rating of almost x3! The usually fast performing GVP on the other hand trails all the Blizzards and even the 28MHz Viper! Overall, the GVP is one of the fastest boards tested.



THE FACTS AND FIGURES IN FULL

BENCHMARKS: INTEGER

A series of mathematical speed tests using Integer mathematics only.

	Test	EmuTest	Writepixel	Sieve	Dhrystone	Sort	Ellipse	Matrix	IMath	MemTest	LineTest	InstTest	AOA
Hawk FPU no RAM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Standard A1200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TurboTech A41200	1.37	1.20	1.05	1.29	1.21	1.17	1.24	1.12	1.22	1.04	1.35	1.20	1.20
Zydec	1.98	1.46	1.21	1.81	1.44	1.35	1.60	1.24	2.20	1.07	2.04	1.58	1.58
Blizzard 1220/4	3.44	1.80	2.31	3.17	2.67	1.53	2.94	2.38	3.66	1.07	3.53	2.59	2.59
Viper II 33/50MHz	3.36	1.50	2.71	3.58	3.34	1.35	3.23	2.81	2.39	1.05	3.98	2.67	2.67
Viper 28MHz	3.58	1.92	2.50	3.48	3.11	1.59	3.29	2.48	3.26	1.09	3.99	2.75	2.75
Viper II 40/28MHz	4.17	1.66	3.26	4.30	4.01	1.47	3.88	3.38	2.87	1.07	4.82	3.17	3.17
Blizzard A1230 40MHz	4.31	1.75	3.45	4.55	4.27	1.53	4.44	3.43	3.87	1.08	5.14	3.44	3.44
GVP A1230 50MHz	4.99	1.73	4.29	5.15	5.22	1.54	5.39	4.16	4.29	1.07	5.75	3.96	3.96
Blizzard A1230 50MHz	5.47	2.96	4.32	5.71	5.35	1.96	5.57	4.28	4.85	1.10	6.43	4.36	4.36

BENCHMARKS: FLOATING POINT

A series of mathematical speed tests using floating point mathematics and the FPU if present.

	Savage	FMath	FMatrix	BeachBall	Flops	TranTest	FTrace	CplxTest	AOA
Standard A1200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TurboTech A41200	1.33	1.36	1.27	1.33	1.33	1.33	1.32	1.31	1.32
Zydec 4Mb RAM	1.75	1.93	1.69	1.73	1.75	1.76	1.74	1.81	1.77
Viper 28MHz	3.13	3.38	3.10	3.08	3.13	3.16	3.11	3.29	3.17
Blizzard 1220/4	3.15	3.39	3.07	3.11	3.16	3.19	3.14	3.22	3.18
Blizzard A1230 40MHz	3.81	4.14	3.95	3.74	3.81	3.83	3.78	4.23	3.91
Blizzard A1230 50MHz	4.76	5.18	4.94	4.73	4.77	4.81	4.73	5.29	4.90
Hawk FPU no RAM	152.23	12.34	1.65	13.91	35.31	25.00	56.19	1.65	37.28
Viper II 40/28MHz	112.76	16.29	3.89	24.21	37.86	62.66	69.49	5.23	41.55
Viper II 33/50MHz	197.00	24.53	3.98	27.98	65.76	67.08	103.61	4.98	61.86
GVP A1230 50/50MHz	199.35	27.76	6.07	36.07	66.86	90.29	121.51	7.08	69.37

GENERAL FEATURES

The various options and possible configurations for each board.

	CPU	MMU	Speed Mhz	RAM Mb	Type	SIMM Slots	FPU Mhz	PLCC /PGA	Expansion?	RTC	System Reviewed	SCSI 2
Blizzard 1220/4	68EC020	No	28	4	SMT	None	14/28/40	PLCC	None	Yes	£199	£na
Blizzard A1230 40MHz	68EC030	No	40	0-64	SIMM	2x72	14/28/40/50	Both	Yes	Yes	£449	£poa
Blizzard A1230 II 50MHz	68030	Yes	50	0-64	SIMM	2x72	33/40/50	Both	Yes	Yes	£470	£poa
GVP A1230 50/50Mhz	68030	Yes	50	0-32	SIMM	2xcustom	50	Both	Yes	Yes	£599	£49
Hawk FPU no RAM	None	n/a	n/a	0-8Mb	SIMM	1x72	14/20/33/40/50	PLCC	No	Yes	£299	£na
TurboTech A41200	None	n/a	n/a	4	ZIP	None	n/a	n/a	None	Yes	£159	£na
Viper 28MHz	68030	Yes	28	0-8	SIMM	1x72	14/28	Both	None	Yes	£299	£70
Viper II 28MHz/40MHz	68030	Yes	28	0-128!	SIMM	1x72	33/40/50	PGA	Yes	Yes	£369	£70
Viper II 33Mhz/50MHz	68030	Yes	33	0-128!	SIMM	1x72	33/40/50	PGA	Yes	Yes	£399	£70
Zydec	None	n/a	n/a	0-8	ZIP	na	14-50	Both	None	Yes	£150	£na

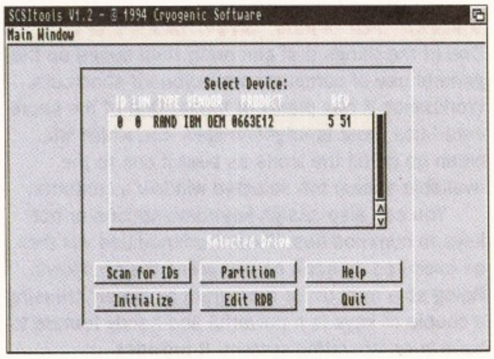
Warp Engine

Do you feel the need for speed? Richard Baguley investigates the latest word in speed for the A4000.

More haste less speed, goes the 15th century proverb. Of course, this was several hundred years before the invention of the computer, when DTP was no more than a twinkle in Mr Caxton's eye and raytracing was something you did with a candle and a piece of paper.

These days, computer users are getting exceedingly greedy, what with all this new fanged technology type stuff. They're also getting increasingly unwilling to wait for their raytraces to finish, so it's not surprising that there is now a growing market in accelerators for all types of Amigas. The Warp Engine is not a piece of *Star Trek* type hardware, but a new accelerator for the A4000, based around a high speed 68040 CPU. It's available in three speeds (28, 33 or 40 Mhz), and completely replaces the CPU daughterboard inside the machine. The model reviewed was the 40Mhz one.

Also built into the accelerator is a full SCSI-II interface, which with an appropriate hard disk gives some stunningly fast disk access. We tested this with an IBM SCSI mechanism, and this gave a very acceptable data transfer speed of 3Mb per second, which contrasts well with the 1Mb per second that you can usually get out of a disk connected to the IDE interface built into the A4000. This mechanism also only used the SCSI standard.



Also included with the Warp Engine is the extremely easy to use SCSItools software.

FACTS & FIGURES

In order to give you some idea of what sort of speed increase you can expect from the accelerators reviewed, we have devised a set of standard tests which give you an idea of the sort of speed increase you can expect in a variety of situations, instead of relying purely on benchmarks. For reference we have also included the figures obtained for the GVP G-Force .

	A4000 040	G-Force 4000/040	Warp 40 Mhz
ImageFX[1] Fill	36	21	20
Imagine[2] Render	289	123	119
AIBB[3] Tests			
Graphics	3.16	3.68	3.56
Integer	3.83	10.19	9.83
Floating	15.28	24.79	24.77

1 – The time (in seconds) to do a full screen radial fill box on a 640 by 256 screen on version 1.5 of ImageFX

2 – The time to render an *Imagine 3* screen which included several algorithmic textures.

3 – Amiga Intuition Based Benchmarks (AIBB) is a program which carries out a series of complex tests to determine the speed of the machine. The figure gives the improvement over an unexpanded A1200 in each category.

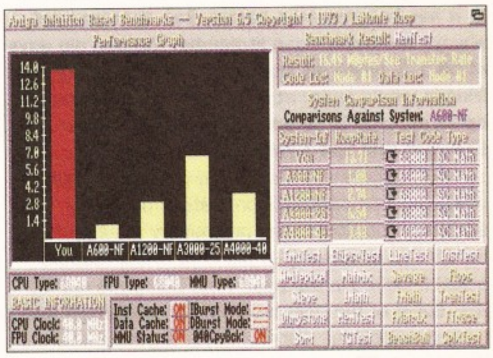
Memory is fitted to the Warp Engine in four SIMM slots which take the standard 72 pin type. For the 40 Mhz model, you won't get the full speed out of it unless you use 60 Nanosecond RAM, as anything slower will mean that the CPU will be sitting around waiting for the memory to catch up. Unlike most other accelerators, SIMMS of different sizes can be mixed, although this can cause problems with some programs.

If different size SIMMS are used, the memory will not be in one continuous block, but in a series of blocks at different locations in the memory map. This will cause problems with programs such as the Emplant Mac Emulator and AdPro which can only use memory which is in a single continuous lump. If there are any gaps, these programs can only use one block of memory, although other programs running at the same time will be able to use this memory space. There are four SIMM sockets on the Warp Engine board, giving a maximum of 128Mb, using 32Mb SIMMS.

Not only does the Warp Engine run faster than a standard Amiga, but the memory fitted to the board can be accessed significantly faster than that fitted to the motherboard. Memory access on the A4000 has always been slow, and this creates one of the main performance bottlenecks in the machine. According to Sysinfo, moving data around in the memory fitted to the Warp Engine is just over four times faster, although I would expect the speed increase in real life situations to be somewhat less than this.

A single disk of software is included with the Warp Engine, which includes various utilities for configuring the board and setting up SCSI drives. It's not necessary to use this software, as access to the SCSI bus is controlled through a standard device, so programs such as HDToolbox and RDPrep can be used to set up and format disks. Two other programs are also included. These are WarpROM (which copies the Kickstart ROM into fast memory and redirects all calls to this) and WarpRAM (which sets up the Warp Engines RAM).

The Warp engine is certainly an impressive piece of equipment. It's extremely fast, and the SCSI interface is really an added bonus. Although the AIBB benchmark tests give a speed slightly lower than the GVP A4000 accelerator (reviewed in issue 40 – 80%), the practical tests seem to be slightly faster. However, the margin is so small that I wouldn't really count it as significant. Put it down to experimental error. You should also bear in mind that 70 Nanosecond RAM was used in the speed tests for the Warp Engine, which may result in occasional wait states, where the CPU is waiting for the memory to catch up. Once you take into account the price of a few Megabytes of memory, it would be around the same price as the GVP card, but it also has the added benefit of the built-in SCSI-II interface. If you want to push your A4000 forward and add SCSI peripherals at the same time, this is the card I would recommend. AS



As you can see from the graph on the left, memory access is significantly faster on the Warp Board than on other Amigas.

WHAT
A4000 accelerator
£559 (bare board)
£799 (28Mhz)
£1199 (40Mhz)
Not including memory
WHO
Macrosystem Development
WHERE
Premier Vision ☎ 071 721 7050

CHECKOUT
WARP ENGINE

Speed **97%**
Faster than a very fast thing indeed on a very fast day with a good following wind. Fast!

Expandability **85%**
The SCSI-II interface is very fast, and the ability to mix different sizes of SIMMs is nice to see.

Documentation **80%**
Well written, with good explanations of all aspects of installing and using the card.

Value **80%**
It's certainly not cheap, but it is very fast and combines the function of accelerator and SCSI card into one.

Overall rating **92%**
An extremely fast and well designed accelerator, which combines a faster CPU and SCSI interface.

AMIGA SHOPPER BEST BUY

Upgrade or die!

Graeme Sandiford begs you to upgrade your prehistoric version of Workbench... now!

The Amiga has one of the best GUIs (Graphical User Interface) of any computer system and, with the arrival of Workbench 3, it has become even better. But, that was not always the case. I can remember the bad old days of OS 1.3, when my Atari ST and Mac-owning friends would sneer at my poor old Amiga and all I could manage in defence of my machine was a sheepish grin and a shrug.

But, believe it or not, some people are still using this comparatively prehistoric operating system. According to the preliminary results of our reader survey around 16 per cent of our readers are still locked in the past. Hey! Don't you realise that some of the best programs on the Amiga won't work on machines working under anything less than Workbench 2?

I mean, it's slow, ugly and, quite frankly, it's embarrassing – it's worse than the ST for goodness sake. Right, now I've calmed down a little, tell me why you haven't upgraded? You can't afford to buy a new Amiga and there is no point in upgrading to version 2 when you'll only have to upgraded to 3 later on.

But, now there is a third option, you can upgrade your existing machine to the latest version of Workbench, 3.1. But, what do you get for your money, how easy is it to upgrade and is it really worth it? Read on and find out how Workbench 3.1 can effect the way in which you use your machine.

EASY INSTALLATION

If you already own a Workbench 3.0 machine, such as a A1200 or A4000, then installation will be a piece of cake. All you will have to perform is the software installation. But, if you own a pre-Workbench 3 machine you will have to be prepared to roll up your sleeves and get your hands dusty to install the ROM chip.

Be warned though, if anything goes wrong during the installation both Commodore and Village Tronic will not be held responsible for any damage. Of course, if you are not used to such operations, or if your fingers shoot bolts of static electricity if you go near an opened computer, you should get a qualified engineer to install the ROM.

However, the upgrade comes with sufficient instructions. It details the procedures you need to follow to identify the exact model and revision of the Amiga you have. Once you have found out which procedure you should follow you shouldn't encounter any problems.

The Workbench software installation is even easier and you don't even have to get your hands dirty. If you are using a floppy-only system it is even easier – just pop in the disk and bootup. If you are using a hard drive then you'll want to install the new version of Workbench on to your Workbench partition. An installation script that uses Commodore's Installer utility is included.

As Installer is used you can play as big or as small a decision-making role as you want. One of the things you might want to decide to do is to keep some of your old files and get Installer to check with you before it deletes certain files (such as your user-startup). It can also move several older system files to a directory called old. This can be handy if you have software or hardware that relies on specific assignments or instructions. After the installation has been completed you will not recognise your old machine – you'll be glad too.

VIVE LA DIFFERENCE

So what will have changed? If you've upgraded from 1.3, almost everything will have changed for the better. If you have changed from 2.0 or 2.1 you notice a few changes, but nothing too spectacular. If you've upgraded from version 3.0 you would be forgiven for not noticing anything at all.

Perhaps the best and most obvious change that has taken place is the appearance of the Workbench screen. For starters, it quite simply looks better. Gone are the hideous menus and windows of 1.3 – these are replaced with new-look items. These are given a three-dimensional look thanks to clever use of shading and highlights. The windows also have an explode box at their top-left corner, so that you can grow or shrink a window with a single click.

If you are anything like me, you'll also have another difference in your desktop's appearance after a few minutes of experimenting. It's hard to resist the temptation of having a nice pretty picture as your Workbench backdrop. This is great fun and is dead impressive. One thing I've noticed is that I sometimes work faster or slower depending on the image I have displayed. A pleasant impressionist painting can make me work that much slower, while a nice *Babylon 5* pic can improve my productivity no end – honest!

Another difference is the choice of screen modes you are given. You can use a variety of different screen modes such as PAL: Low-res and NTSC: Hi-res interlaced. Obviously the modes you can choose from is limited by your computer's graphics chipset and the type of monitor you have.

TAKING THE SHORT-CUT

One of the things that can really help speed up the general use of computer are keyboard short-cuts. Workbench 3 has plenty of those. One of the short-cuts I use most is <right-Amiga> <.>, which will clean up (fit all the icons as best it can to the available space) the selected window's contents.

You can also assign key-combinations or hot-keys to commodities. These commodities will then be executed as soon as you press their hot-keys. Being able to activate a program by simply pressing a couple of keys is a powerful and handy feature to have in an operating system. It provides convenience, added functionality and greater control over your working environment.

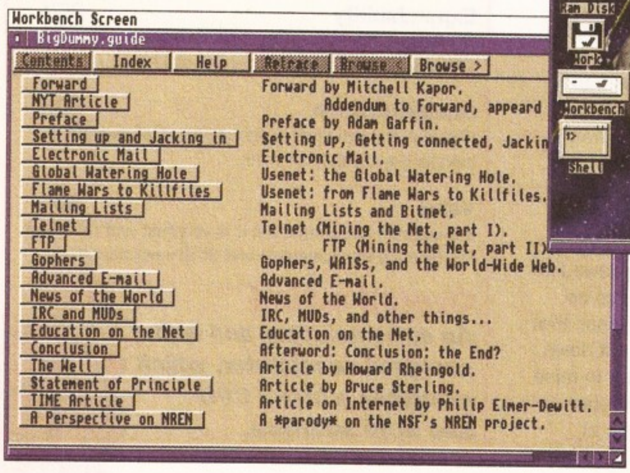
A DISK, IS A DISK, IS A DISK

One commodity that warrants a mention of its own, because of its sheer usefulness, is CrossDOS. This wonderful piece of software can be used to gain access to PC disks. Yes I know that PCs are boring, but being able to transfer files to PC formatted disks can be a very useful thing indeed. You can transfer all manner of files text, images, animations and nowadays even 3D objects.

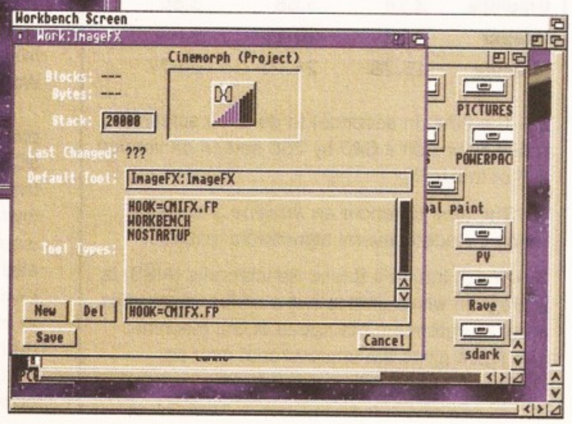
What puts most people off attempting this sort of exchange is the complexity of it all. However, using CrossDOS is incredibly easy. Once it has been set up, using CrossDOS is almost completely



Right: Sooner or later, you end putting a colour backdrop on your Workbench screen. It's a scandalous waste of memory but, it's great fun!



Left: AmigaGuide documents can be navigated easily and they can even include images and samples.



Below: Tool Types can be used to control a program's characteristics when it is executed.

transparent. You simply insert a PC-formatted disk and it will automatically be recognised as such by the Amiga's filing system. A disk icon labelled PC0: or PC1: will pop up. You can use this disk as you would any other, however PC disks do have a smaller capacity than a standard Amiga disk. Another thing to bare in mind is the naming conventions that PC-users are restricted to, a filename must have no more than eight characters, no spaces and an extension with a maximum of 3.

However, CrossDOS's abilities are not limited to floppy disks. It can be used to format virtually any kind of device whether it is a hard drive partition, optical drive, removable drive and High-Density floppy disks. This is great for people with an emulator as it gives the emulator access to a wide variety of storage devices. It can also be of great benefit to people who want to transfer huge files to other platforms.

One of the things that has been a real pain to do before the advent 3.1, was fitting a CD-ROM drive. Well, attaching a drive has never really been a problem, but finding and installing the correct filing system and driver has. Fortunately 3.1 comes with a CD-ROM filesystem and device driver, so accessing files contained on CDs is easy. In fact, as with CrossDOS, once the appropriate files have been installed you can use CD-ROMs as you would any other storage media.

There is an added twist though, 3.1 also has support for the CDXL format. CDXL is a animation format that can display a sequence of images as the CD-ROM is being accessed. This means you can display animations that are larger than your available memory. To view these animations you can use MultiView or any other display program that can handle DataTypes.

MultiView is a great addition to Workbench 3.0 and 3.1, that can use DataTypes to display a variety of different file types. It can be used to display pictures, text, animations and even playback samples. The program is also very easy to use, after running MultiView you need only select a file and the program will automatically check its filetype and take the appropriate action.

The reason MultiView can tell what kind of a file has been selected is because it uses another new feature of Workbench 3 – DataTypes. In fact, DataTypes can be used with any program that wants to make use of them. This can be especially useful for graphics programs as they can load and save images of different formats as long as they have the appropriate DataType. This can make the programmer's job a lot easier, as they don't have to worry about understanding all the different graphics and sound formats.

The best way of describing the way in which DataTypes work is that they provide a description of the file to the program. Adding a DataType is easy, you just drag the new DataType to your devs:DataType directory. A large number of DataTypes are actually available in the PD world, so they are cheap and easy to get hold of.

> **"Workbench 3 was designed primarily as a bug-fix for 2.1 and to provide features for the new AGA graphics chipset."**

BENEFITS AND FEATURES

Locale is yet another impressive part of Workbench 3. This feature can be used to customise your working environment to match your language and alphabet. For example, you can modify the text that appears on screen, the keypad for the calculator, numbers, and time and date formats. Again, like DataTypes, this feature can be utilised by programmers. Locale can be used with programs so you don't have to learn another language for a program to be usable in a different country.

On-line help for programs can be easily added thanks to the Amigaguide format. The Amigaguide DataType can be used by MultiView to display hypertext documents. Hypertext documents have links to other parts of the document, so you can navigate a document quickly and easily. You can even include images and sounds in your documents. This makes it a great teaching aid and helpful facility to have incorporated into a program.

Tool Types are another useful feature. They can be used to specify the parameters that will be used by a program. To access a program's Tool Types, all you have to do is select its icon and get Information on it. You can then alter a program's Tool Types by select a Tool Type field and then changing or adding an entry. Most programs that support Tool Types actually come with the options commented out , so all you have to do to activate them is to remove the angle bracket.

IS IT ALL WORTH IT?

Well is it really worth paying between £84 and £95 to upgrade your machine? Well, that depends a great deal on your current operating system. While the gap between 1.3 and 3.1 is enormous, the difference between 2.1 and 3.1 is still noticeable, but you would be hard pushed to tell the difference between 3.0 and 3.1.

I am going to have to be brutally honest here, it's not worth paying over £94 pounds to upgrade from 3.0. The only remotely good reason for buying this upgrade is if you absolutely must have official Commodore CD-ROM support.

If you are a 2.1 user the decision is a little tougher. Although Workbench 3 was designed primarily as bug-fix for 2.1 and to provide features for the new AGA graphics chipset, I don't think 3.1 offers a great deal more than 2.1. A large number of the features need an AGA-machine to fully exploit them. You would be better off buying a new machine and that way benefit from the new machine's abilities.

Upgrading from 1.3 to 3.1 is a must – it's the next best thing to having a new machine. We installed 3.1 on an A1500 which is usually stuck in the corner of the office – I never touched it unless I needed to test something that works on a 1.3 machine, but now it has been transformed. It's great – I can actually "use" it now, it's even got a CD-ROM installed as well. It runs faster too, as a result of the improved libraries.

It can even improve the compatibility of the machine. Prior to installing 3.1 we tried running *LightWave 3.5*, but it requires version 2 at least. As a test, we tried it again and it works – not very fast of course, but it does work.

We cannot stress this enough – if you do have a 1.3-machine, please join the rest of us in using one of the best interfaces available today. AS

WHERE TO GET IT

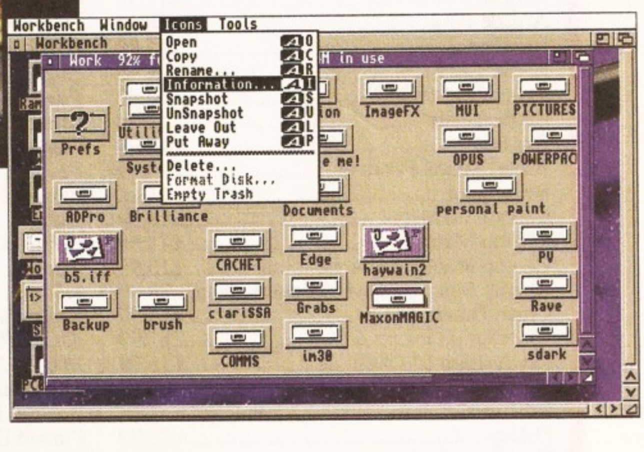
Price: £84.95 (500 & 2000)
£94.95 (3000 & 4000)
Supplier: Blittersoft ☎ 0908 220 196



Right: Multiview can now view animations direct from CD, using the CDXL file format.



Left: Multiview can display all manner things; text, images and can even play samples.



Below: This menu shows some of the keyboard short-cuts that are available in Workbench 3.1.

Non-linear future

Gary Whiteley gets a sneak preview of the first Amiga non-linear video editing system.



Digital Broadcaster 32 is a Zorro III card which works in either an accelerated A4000-030 or A4000-040.

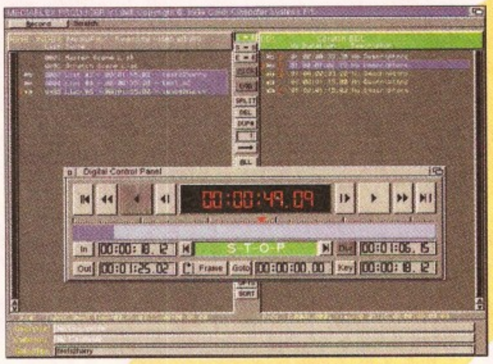
With non-linear systems increasingly looking like the future of video editing I visited White Knight Technology to get a demo of AMI's *Digital BroadCaster 32*, the first non-linear editing system for the Amiga to actually hit the street. Here's an account of what I saw. This isn't a review, because firstly it hasn't been possible to get my hands on the full kit for a long enough period to give it a good testing, and secondly because there are still slight adjustments being made to the software, although the unit *is* now ready to rock 'n' roll.

Digital BroadCaster 32 is a Zorro III card which works in either an accelerated A4000-030 or A4000-040. It features real-time onboard hardware to compress and decompress video streams to and from hard disk to give instant random access to any stored frames, or playback video clips instantaneously in any quality up to full-spec broadcast. You might be thinking that the *DBC 32* is just a variation of DPS's excellent PAR system, and you'd be right – up to a point. However, what makes the *DBC 32* different is that its main function is as a non-linear video editor, which means that any of the clips which have been grabbed from video to the *DBC 32*'s dedicated hard drive can be arranged for instant playback in any chosen order, and trimmed to fit, just like 'real' video editing, only with fingertip control and no waiting for tapes to spin up and play back.

Video input and output is via an external breakout box which has connections for composite, S-Video and component (Betacam) video inputs and outputs, as well as connections for the two standard time codes (LTC and VITC) and CSync output. *DBC 32* offers a wide range of image quality, depending on the compression ratios chosen when the video clips are digitised.

By using time code to make an Edit Decision List (CMX format) the program can be rough-cut on the *DBC 32* and then 'on-lined' in a conventional edit suite to achieve full video quality. This type of low-quality editing is useful when the programme will be a long one and it would be cheaper to on-line the finished product (typically, only 12 minutes of broadcast-quality video can be stored on a 2.1Gb hard drive).

For shorter programmes, such as adverts and pop promos, there's no need to take this route because it should be possible to fit the required clips on to the hard disk, edit the programme with the *DBC 32* and output the finished product direct to tape for delivery – even at full broadcast quality. For the technically-minded, the *DBC 32* fulfils CCIR 601 and 4:2:2 digital video standards and outputs 720 x 576 pixel overscan images in PAL. It also works in NTSC.



We will be doing a full review of the Digital Broadcaster 32 as soon as we can get hold of one

FLEX YOUR MEDIA

MediaFlex Producer, the software which drives the *DBC 32* and controls all the functions of the *DBC 32* – from digitising and compression ratios to editing and playback. It appears to be fairly simple to use, with clips being dragged, or cut and pasted, into position. Although there is no on-screen representation of the clips as there is with some other non-linear systems (licensing this idea from the copyright holders would be too expensive for AMI) each clip can easily be displayed on a video monitor as it is called up, and clips can be tagged with descriptions to keep track of them more easily. Trimming clips for accurate editing is easy, while the stored clip remains unaffected in any way. Only the playback reflects the changes made to the edit.

With some extra work and software A/B roll editing with transitions is possible, though from what I gathered during the demo this is rather time consuming at the moment as all the transition frames have to be processed before the transition can take place. Upcoming versions of the *DBC 32* promise to speed up this process considerably.

WHAT ABOUT SOUND?

DBC 32 can link up with an optional hard drive and Sunrize Studio 16 card, or a dedicated new 32-bit Zorro III card, to provide simultaneous CD-quality audio digitising and playback along with video. Sound clips can also be edited just like video clips. As well as being a non-linear editor the *DBC 32* can also be used for recording single frame animations and time lapse recording.

During the demo I must say that I was very impressed with the quality and performance of the *DBC 32*, though there are still some areas of the software which could do with improvement. For instance, there is no drive defragmentation routine available to reorder the data on the storage drive, so when the drive starts to fill up fragmented files slow down the transfer rates, which could be a problem at broadcast quality.

Another thing – *DBC 32* only works in fields. This is fine for absolute quality, but not always necessary and at the moment there's no option for switching between fields and frames. No doubt these problems will be ironed out and the *Digital BroadCaster 32* will go on to achieve the success it deserves. Even at around £8,500 (ex-VAT) for a complete audio/visual system, the *DBC 32* compares very favourably with other (non-Amiga) non-linear edit systems. AS

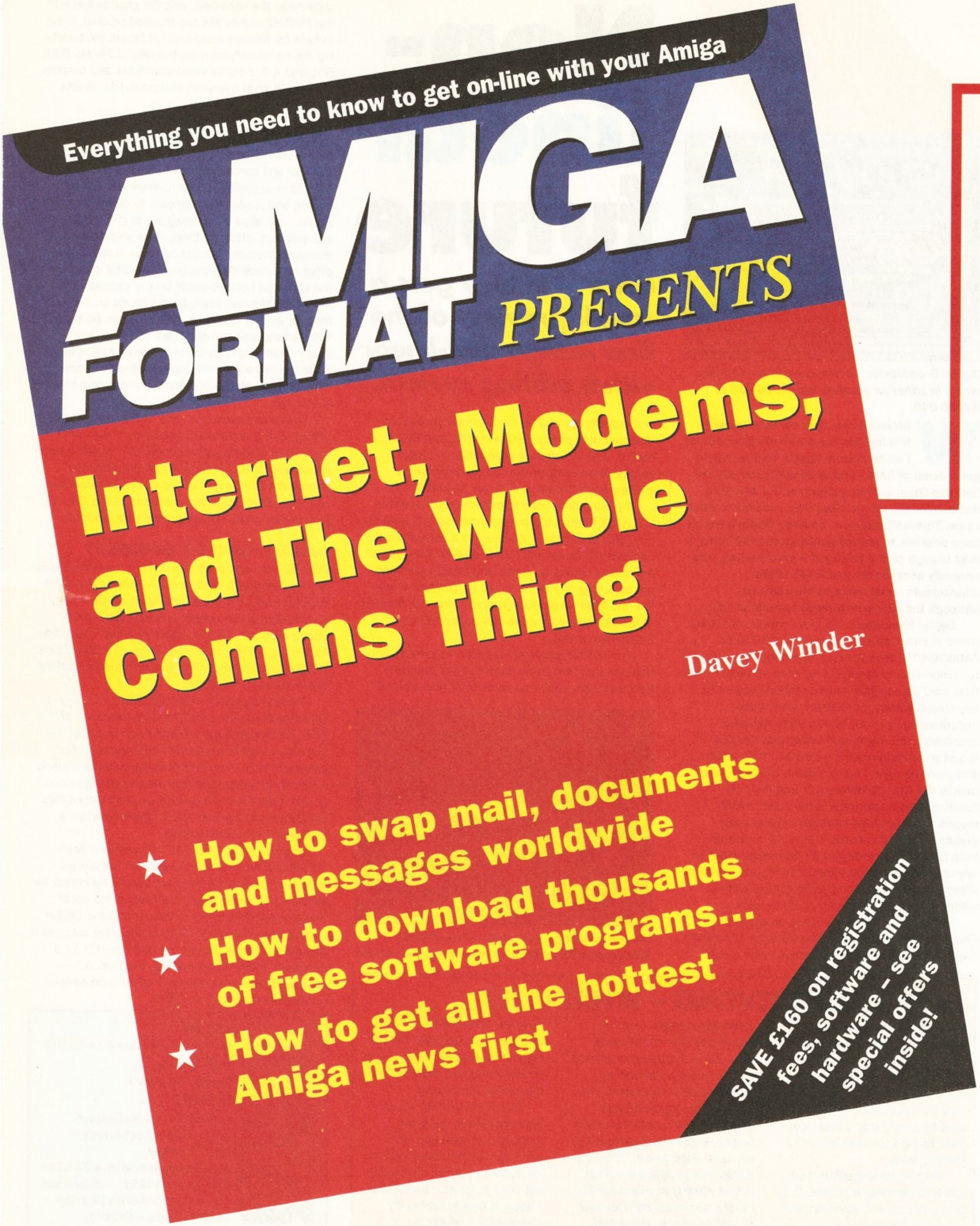
NON-LINEAR EDITING – WHAT IS IT?

In traditional video editing segments of video are copied from the source tapes to the edit tape. The trouble is, tapes are linear, so if you want to access a sequence that's 45 minutes into the roll, then you have to wind the tape on until you get there.

With non-linear editing you still have to wind the tapes, but only until you've transferred the required clips to digital computer storage. Once on digital disk, the compressed data can be randomly accessed and so a non-linear editing system can be developed. The data can be organised and edited directly on the computer screen, with instant playback of any part of the show. Once edited, the programme can be output directly to videotape for distribution or an Edit Decision List (EDL) can be generated from any time code supplied with the digitised clips and the original tapes then taken into a conventional edit suite for mastering, effects etc.

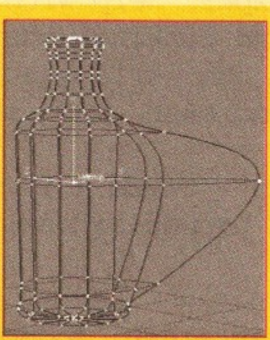
Non-linear editing saves time previewing edits and reduces wear and tear on precious master tapes. And because it is digital the quality out is as good as the quality in – even at broadcast quality compression ratios.

WHAT
Digital Broadcaster 32 – £3989
WHO
Applied Magic Inc.
WHERE
Exclusive UK Distributors:
White Knight Technology ☎ 0992 714539.
Also required: Fastlane Z3 SCSI-II controller (£299) and Seagate Barracuda hard drive (2.1Gb – £1439, 4.2Gb – £2269).


Everything you need to know to get on-line with your Amiga
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Smooth Operator

Frustrated with your 3D modeller? Gary Whiteley recommends FreeForm3D for interactive spline-based modelling.



See how a spline stays curved when a knot is moved? That's because splines are mathematically-calculated curves which follow the smoothest line between each pair of control points.



FreeForm3D's modeller screen (Perspective View) is where the donkey-work of making spline objects is carried out. This bottle has both flat and curved faces made with the tensioning features.



After merging and rendering in Imagine, here's what my bottle looks like. Of course this type of object can be made with most modellers, unlike the other, more complex, shapes which FreeForm can also produce – such as the slippers also in this frame.

FreeForm3D is a spline-based 3D object modeller designed for constructing smoothly-surfaced objects which can then be exported for use in *Real 3D2, Imagine, VideoScape* (and, by implication, *Lightwave*) and *Aladdin4D*. At first sight *FreeForm3D* can be a little daunting because it isn't like any of the modellers you've ever seen.

What's different about *FreeForm3D* is that it uses splines to build objects and, as a result, the on-screen objects tend to look a little different to what you might expect from a modeller. The biggest difference is that there are no visible polygons, because spline objects don't employ polygons as faces – splines are patched together by smooth mathematically-generated faces. *FreeForm3D* employs several methods for building objects. The simplest is to draw a single spline as the cross-section of an object and then spin it around an axis to produce a solid. This method is great for producing objects which are symmetrical around a single axis, such as bottles and glasses.

To facilitate the drawing process *FreeForm3D* supports three different spline controls which define whether the spline which connects two points is fully-curved (single point), partially curved (double point) or forms a sharp angle (triple point). A more novel building method is 'Rail Extrude', where a template 2D spline shape is extruded to fit between two user-defined spline curves both containing the same number of points. The result? – anything from an aeroplane wing to futuristic-looking streamlined lumps. Rail extrude is a rather powerful tool which can be used to make all sorts of useful shapes almost as if by magic.

But perhaps the most interesting modelling process involves the use of tension, which defines whether the surfaces between two spline curves are flat or curved. For instance, the bottle illustrated here has both flat and curved faces made by setting the tensions of various sections of the bottle and then using the 'blend tension' function to seamlessly blend the smooth surfaces towards the flat ones and vice versa. *FreeForm3D* also has a powerful bones system which enables any object to be deformed simply by moving just a few control axes around.

FOUR VIEWS

Any *FreeForm3D* object can be displayed and edited in either Top, Side, Front or Perspective views. Objects can be scaled, rotated, or moved on screen and rendered at four different levels for previewing. Individual points can also be easily repositioned, and when you're satisfied with the object it can be saved in native *FreeForm3D* format, as well as *Imagine, Videoscape* or *Real3D2* formats. To make editing complex objects more straightforward *FreeForm3D* employs a layering system which allows many sub-objects to be in use, but not necessarily visible unless they are in the currently-displayed layer.

THE VERDICT

Like most software, *FreeForm3D* isn't perfect – it does have its quirks. I found the documentation to be rather sparse at times, which caused occasional confusion. For instance, the docs suggest that after an object has been exported in *Imagine* or *Videoscape* format you should "merge the points how you wish" to produce both flat and smooth faces. In practice this means merging only those points attached to smooth faces, though this isn't explicitly mentioned. To make modelling easier I'd also like to see hidden line removal incorporated as an option in the editor, plus the addition of more primitive objects to the circle and plane currently provided. *FreeForm3D's* learning curve isn't too steep, though you'll have to apply some thought before you get the complete picture. But don't let a little learning put you off, because *FreeForm3D* is certainly worth the effort.

Without doubt *FreeForm3D* will be a useful addition to your current set of 3D-tools, especially if you do a lot of modelling work. With a little time and effort you should be able to design objects which are often quite difficult to make with programs like *Imagine* and *Lightwave*. At least that's my excuse. For those of you with Internet access a demo version of *FreeForm3D* (for 030/040-equipped Amigas) is available from pub/aminet/gfx/3d as FreeForm3D1.7.lha. AS

WHAT ARE SPLINES?

Programs such as *Imagine* and *Modeller3D* (*Lightwave's* modeller) produce polygon-based objects whose surfaces are composed of triangular or multifaceted polygons. These objects can be difficult to use to produce the shapes you need. Spline-based objects are composed of curved surfaces which interconnect the splines which define their shapes. When loaded into the appropriate software spline objects render very smoothly.

Spline objects are manipulated by pulling the "knots" and points which define the spline around, and when a knot or point is moved the spline smoothly realigns itself to fit the new knot or point positions, rebuilding the attached curved surfaces in the process.

WHAT

***FreeForm3D v1.7* – US$59.90 (£45 Approx)+ $5.00 P&P**

WHO

Fori Owurowa, 1873-75 Cropsey Ave, Brooklyn, NY 11214, U.S.A. (You can E-mail Fori as enigma@dorsai.dorsai.org.)

CHECKOUT
FREEFORM 3D

Documentation 73%
AmigaGuide docs only (though you could print them out) which are, on the whole, very helpful.

Features 79%
FreeForm3D has many valuable features, not least rail extrude and tension, and there's scope to add more.

Ease Of Use 75%
When you find an easy modelling program, let me know! *FreeForm3D* is as easy to use as any modeller I know.

Value For Money 85%
It might not be the world's most flexible spline-based modeller, but at $64.90 it won't break the bank.

Overall 78%
With some refinements FreeForm3D could be excellent. As it stands, it's a very useful piece of spline-modelling software which seems to work well.

CD REVOLUTION

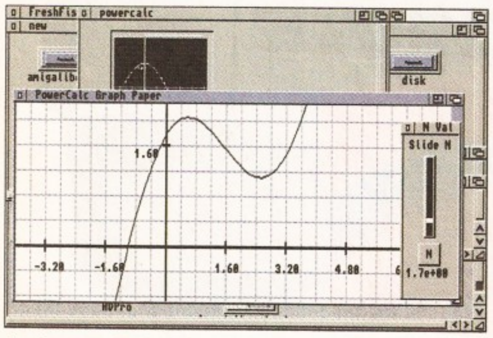
They're silver, they go round and they've got lots of stuff on them – but are they any good? Nick Veitch rounds up the latest CD offerings.

FreshFish May/June 94

17 Bit ☎ 0924 366 982 (£19.99 + 75p P&P)
Probably the best known PD collection in the world is the bizarrely eponymous Fred Fish Collection. It was a great day for Amigakind when it was released on CD. But even the mammoth storage capacity of a CD-ROM cannot hope to contain the complete Fish library, so a series of updates have appeared.

This particular disk includes the contents of disks 976-1000, but obviously it also contains quite a bit more. For a start, there are 151Mb of GNU source code, which is jolly useful if you are involved with UNIX networks. The executeables and libraries are also included, as is a rather healthy amount of documentation.

This fish disc does not contain any Workbench or Parnet software, so if you want to use this disc



A nice graph plotting utility is one rare gem in amongst the dregs on this disk.



You've probably seen it before, but this is the latest version of uChess.

in a CDTV or a CD32 you will also need to have a floppy drive and a copy of Workbench to boot from. But a lot of effort has been made to make sure that these files and utilities will work directly from the CD-ROM. After all, what is the point of having 600Mb of data on CD if you have to keep on copying on to your hard drive? Although everything has been tested (well, Fred says he's tested it and I believe him), some applications will not run without a few Assigns being made.

This disc, and presumably the ones which will follow in the FreshFish series, contain an awful lot of stuff that would not make it on to the FF disks (with a "k"). Things like a large library of rendered images by Bill Graham, a load of hardware and software reviews from Internet and a load of doors for people running BBSs. Almost everything useful on the disc is duplicated in an archived format for use on a BBS.

All in all, this disc is a bit of a disappointment. It is aimed at getting out the latest fish stuff on CD-ROM quickly, but the rest of the space on the disc is somewhat wasted. Hopefully later editions will improve.

CHECKOUT
FreshFish May/June 94

Presentation 90%
Well laid out for the most part, as most Fish stuff tends to be. If in doubt, stick it in a new drawer is Fred's motto.

Ease of Use 78%
I don't really see why this disc couldn't have been bootable and had some Parnet/Sernet software installed.

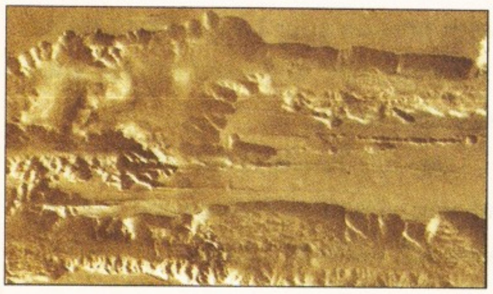
Contents 74%
Apart from the GNU stuff, which is surely minority interest, there is little death-defyingly exciting here.

Overall 82%
I can only hope that coming editions will improve, because I'd like Fred to do well.

Space & Astronomy

17 Bit ☎ 0924 366 982 (£19.99 + 75p P&P)
I must say this disc has the nicest label. It is the famous spacewalk image rendered in a decent number of colours. Unfortunately it goes downhill a bit after that.

This is a generic disc, designed for PC and Mac users too, but you might have expected better support for the Amiga from the likes of Walnut Creek. With 600Mb of space to play with, you would have thought they might have had enough room to include more than just one icon. The result is a very confusing load of drawers and files – if you don't have *Directory Opus*, or equivalent, you'll get lost.



Not the surface of Richard Baguley's brain, but an ealry picture of Mars from several miles up.

The disc does contain various animation viewers, sound files, and utilities, but virtually all these are designed for the PC. However, the bulk of the disc is comprised of GIF images. GIF viewers and convertors for the Amiga are supplied.

The images are grouped according to planet. Interestingly, there are over forty images of Mars, and only four of the moon. The images are generally of very good quality, having been digitally converted from NASA images, rather than scanned in from transparencies.

There's also a large number of text files. Most of these consist of excerpts from the Space Digest, available via Internet. For example, I was very surprised to discover that no plausible mechanism has been proposed to explain the source of Oort clouds [Eh? – Ed].

Most of the text follows similar lines – a list of US astronauts that were once in the Boy Scouts (listed by rank! – Buzz Aldrin only made it to Tenderfoot, so no wonder they let Armstrong get out first) is one memorable inclusion. There are some more general fact sheets though.

This disc has a lot more on it than the "25 years of NASA" CDTV effort, but couldn't touch it for presentation. It does have some more up-to-date images on it, and if you are writing about space for any reason, there is a great wealth of astronomic data on here. Hopefully, there'll be an update with lots of nice pics of Jupiter being bombarded, which will give the chaps at Walnut Creek the opportunity to Amigify the whole thing.

CHECKOUT
Space & Astronomy

Presentation 2%
Boo. One miserable icon, that's all they could be bothered to do (and it was only a dummy one).

Ease of Use 50%
For an all formats disc it wasn't too bad, but they should take a look at MegageM's effort to see how it should be done.

Contents 88%
Mostly shovelware images, but some of the text files are actually very good – if you can find them.

Overall 64%
There are some great things on this disc, if only you can find them. Room for improvement!

FractalPro Image Library

MegageM ☎ 0101 805 349 1104 (about £45)

If you are not completely overwhelmed by fractal imagery, if you aren't seeing Julia sets in your spaghetti and mandelbrots in your dreams, then you may want to warm up your copy of Viewtek and take a spin through this disk.

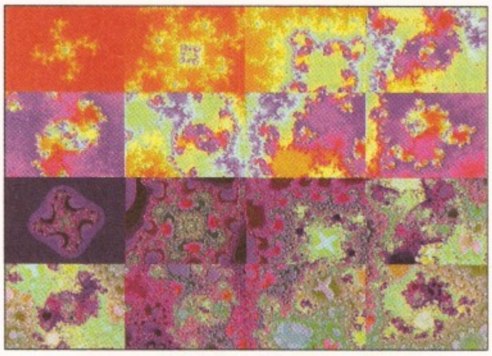
On it are 352 images of various fractals, all generated by Fractal Pro, which you may remember from an *Amiga Format* coverdisk not too long ago. 352 images isn't a very huge number to fit on a disk, but they are supplied in either HAM or IFF formats, and come with a load of different viewers. As well as standard mandels and Julias, there are also some miscellaneous things. One such set is the Wolf set, a set of the author's own devising which, apart from being overly labelled with copyright messages, is quite interesting.

Some of the images are saved as animated sequences, so you can sit back and relax as the set slowly expands. Actually it doesn't – it expands quite quickly, but it was a nice idea.

Among some of the more dubious images to be found are a collection of fractals which have been composited with digitised images of "beautiful women". In a stunning and "original art concept" these pictures show women with fractal skin, or bikinis made out of the julia set. I think he must have got the compositing controls mixed up, because the "aesthetically pleasing" parts of the models are always covered with whirling Mandelbrot images.

Usefully, all of the images come with their associated .xyw files, which mean that if you have a copy of Fractal Pro, you can use these images as starting points for your own explorations into the unknown.

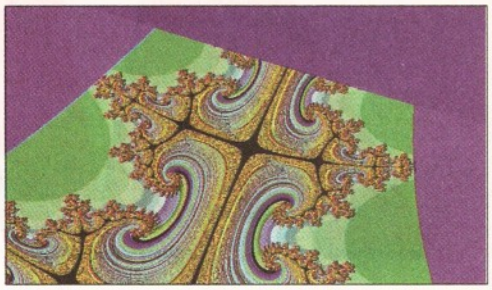
I think it would've been useful if MegageM had included a version of Fractal Pro on the disk. Maybe not the latest one, but at least some old, slow version that you could actually use with this data.



Thumbnail pictures are provided to guide you through the depths of the image drawers.



Hmmm. That's all very well, but what's the point? I wonder how he persuaded them to pose...



A brief look at the Wolf set is all that's required.

CHECKOUT
FRACTALPRO IMAGE LIBRARY

Presentation **90%**
All the files are well divided into little drawers, with associated documentation. You wouldn't even know the Mac/PC stuff was there.

Ease of Use **90%**
It couldn't be easier. Just click on the files you want to view and they pop up on your screen. Magic.

Contents **74%**
At the end of the day, it's just a collection of pretty pictures. And none of the girls have got their baps out either [How shocking! – Ed].

Overall **82%**
At least it shows a great deal of Amiga savvy, but some fractal software would have gone down well.

Clipart And Fonts

17 Bit ☎ 0924 366 982 (£19.99 + 75p P&P)

If you are involved in the creation of anything from *Dpaint* anims to top quality magazines, the one thing you find is that you are always short of raw materials.

This disc aims to solve all those problems by providing a huge store of fonts and clipart, copyright free, which you can incorporate into your own animations, demos, pictures or DTP escapades.

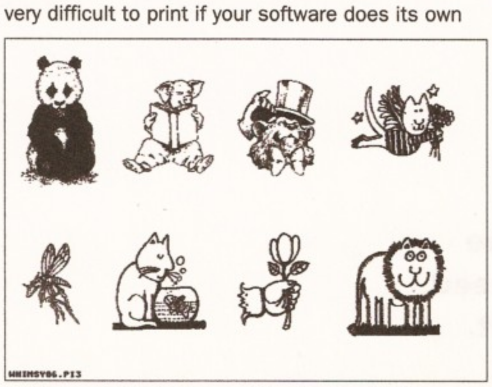
Taking the clipart first, much of it is throwaway stuff. It's all black and white for a start, which might be okay for DTP (if you are only producing black and white output), but it is a bit sad for anything else. You could go through and colour them up, but it would take a rather long time. Many of them are halftoned – which not only makes them almost impossible to colour, it can also make them very difficult to print if your software does its own halftoning.

There is a wide variety of stuff there though, so you may find something useful. All the pictures are stored in EPS, PCX or IFF format. Bizarrely, they are not the same images – obviously they couldn't be bothered converting them all to IFF. The EPSs do work, although if you load them into ProPage, you won't get a preview. This is a bit annoying, as you can't view them any other way – they might at least have provided some thumbnails.

The fonts are another matter. There are quite a few of them. Unfortunately, most of them are stored in Adobe-type pfb files. This means that unless you have something that wants type 3 fonts (e.g. *Lightwave* or *Imagine*), you are a little bit stuffed. The only way to use them is to convert them to Compugraphic jobs. That rather defeats the purpose of having them on CD if you ask me. There are a few Compugraphic fonts on there too, but only about 5Mb worth of them, i.e. 71 fonts. A lot of them are dodgy conversions, and if you are into fonts, I'm sure you have most of them anyway. The old favourites are all there: Albatross, Architect, BodidlyBold, Caligula and so on.

This leaves aside the moral aspects. Most of the fonts are conversions of freeware Postscript fonts, or samplers from font collections. Using them could infringe copyright. Many of them come with text files explaining the copyright situation, and need to be read carefully.

I'm sure you could find lots of useable things on this disk, but I'm equally sure that it could have been a whole lot better. AS



Well, I can think of something to do with the cat, but the rest is a bit sad.



Some of the images could be used for party invitations or business cards for women in the "service" industries.

CHECKOUT
CLIPART AND FONTS

Presentation **50%**
There are icons for all the drawers, but the fonts could have been divided up better.

Ease of Use **30%**
EPS files you can't see and fonts you have to convert. I'll leave it to your imagination why this scores badly...

Contents **24%**
This disk is full, but so is a cow's lower intestine. Most of the clipart is useless unless you are doing a retrospective on 17th Century woodcuts.

Overall **32%**
My hamster could put together a better collection, and he's been dead for 12 years.

Assembler PART 1

It's here at last – the long awaited Assembly language tutorial, brought to you by our own programming expert Toby Simpson.

Welcome to the Amiga Assembly Language course, Shopper style! Many people have been asking us for this, so here it is at last. Over the next few months we will introduce Assembly language programming for the Amiga, and cover a variety of topics such as opening screens and windows, and even programming the hardware directly. For this first part, we will lay down the basic groundwork necessary to make a start, and discuss some of the tools you will need, so no typing this month, but plenty of reading!

THE BARE BASICS

What is a program? Let's have a look at the procedure you might use to run a bath:

1. Enter the bathroom.
2. Turn on the hot and cold taps
3. Bath too hot? If so, turn down the hot tap.
4. Is the bath too cold? If yes, turn down the cold tap.
5. Is the bath full? If no, go to step 3. If yes, continue.
6. Turn off taps.

This procedure contains all the basic elements of a program. A program is a sequence of instructions, which when followed cause a certain result to happen. In this case, the result is the run bath. Not only does our program contain sequence, but it contains decisions. For steps 3, 4 and 5 we check to see if a certain condition has become true, if it has we will perform a different action to the one we will do if it has not.

Finally, our above example has a loop in it. At step 5 we check to see if the bath is full, if is is not, we go back to step 3. These three elements, sequence, iteration and decision when moulded together like this give us a program.

These instructions themselves form the programming language. The bath running example was a very high level approach. We were not worried with how the water got from the water board to our taps, or the exact sequence for turning on a tap. An even higher level might turn the above program into the following one step:

1. Run the bath.

If you were asked to do this, you would then break this down into the individual steps necessary to perform the action. This is generally the difference between a high level language such as BASIC and C, to a low level language like Assembly language; which we are going to learn. With the higher level of language you lose some of the control – after all "Run the bath" doesn't state how hot to make it, or how much water to put in, or indeed which order you are going to do it in. You may lose control, but it's much quicker to "write the program".

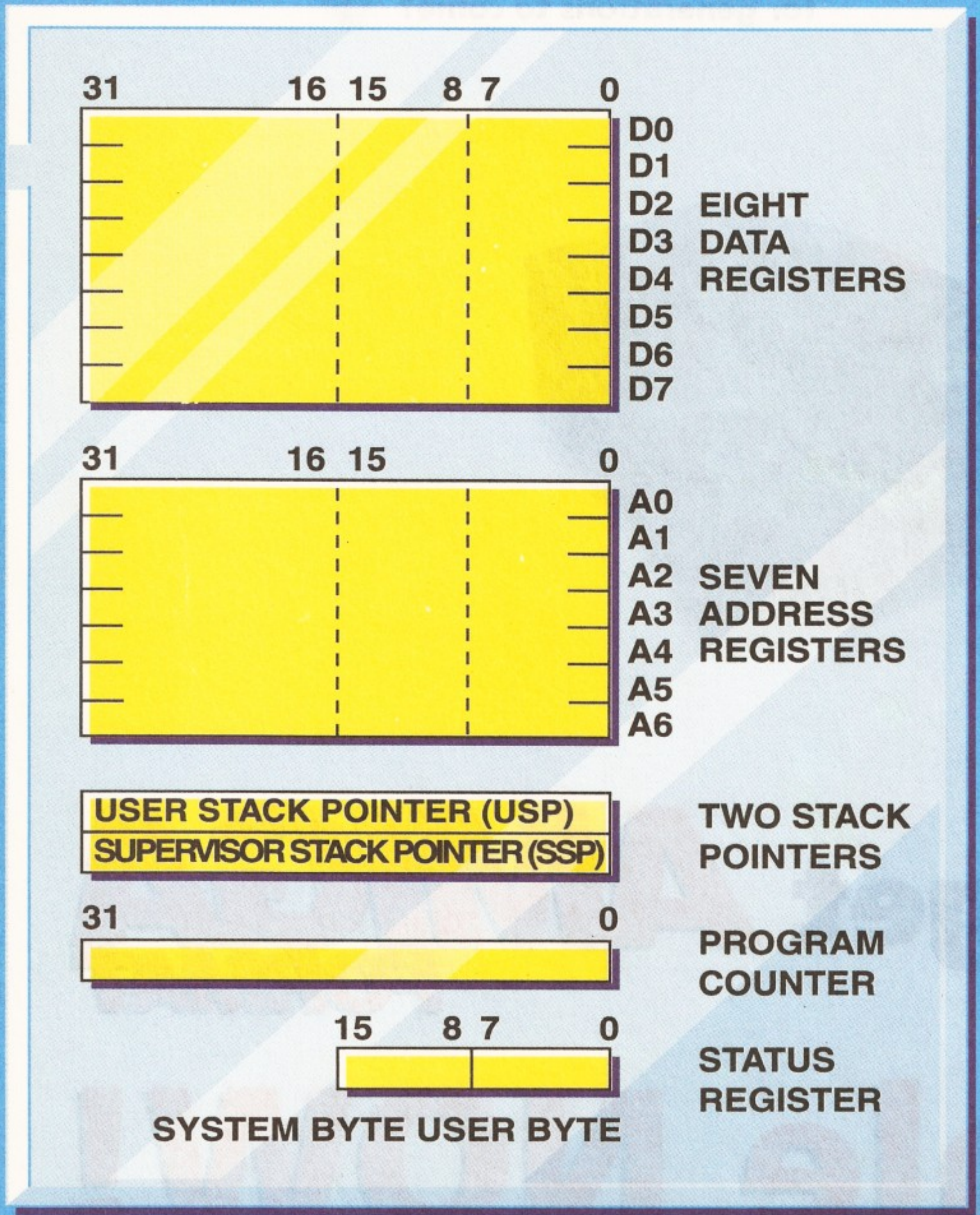
The lower level approach gives you much more control, you can make all the low level decisions yourself – like whether to run the hot or cold water first, how deep to make the bath, how hot to make it, and so forth. Of course, it takes a lot longer to write this program down. And indeed, you are more likely to make errors.

Your computer is a very simple beast. At its very heart is a device called a microprocessor. In the Amiga, this is a member of the 68000 series, manufactured by Motorola. The microprocessor is highly complex, but the process it's designed to perform is simple. From the moment you switch it on, it starts going through a list of instructions (a program) held in memory, and running them. It only stops when something absolutely hideous goes wrong, or you switch your computer off. These instructions are called "machine language", and this is the lowest level of programming you can perform on your Amiga.

Machine language consists of a number of simple operations, such as arithmetic instructions, and instructions to move information around in memory. There are also the operations necessary to make decisions, and then move to different parts of the program accordingly. Let's have a look

68000 internal structure

The diagram below shows you the internal structure of the 6800 processor, and the various registers which it contains. Each of these controls a different part of the CPUs operation.



at a machine code instruction:

```
0000 0110 0011 1001 0000 0000 0000 0001 0000
0000 0000 0001 0000 0000 0000 0000
```

Oh goodness. What does all this mean? Well, the above is the machine code to add 1 to the 65536th memory location inside your Amiga. The first thing to note is that the above is in the binary number system. We work in decimal, we have ten digits, 0-9 and then we carry one to make 10. If you remember maths lessons when you were five, you might recall a units, tens, hundreds and thousands column, a bit like this:

```
1000  10010 1
```

The number "3423" would be "Three in the thousands column, 4 in the hundreds." and so forth. Pretty simple stuff, but computers don't work in tens, they work in twos. Modern computers are digital systems, they understand two states, On and Off; often referred to as 1 and 0, or high and low, or TRUE and FALSE. Each individual binary digit is referred to as a Bit (Binary Digit). If we have a four digit decimal number, we can have 10,000 combinations, from 0 to 9999. If we have a four digit binary number we can have 16 combinations, from 0000 to 1111. The binary system works just like decimal, but with 2s instead, so instead of powers of ten in our column headings, we have powers of two:

```
8  4  2  1
```

So, the number 13 would be one in the 8 column, one in the 4 column and one in the 1 column, a grand total of 13, and the binary number:

```
1  1  0  1
```

You can easily convert numbers to and from binary in this way, get a piece of paper, write down the column headings in powers of two, and to convert to decimal from binary, write the number down under the columns and add up the totals, for example:

```
8  4  2  1  0  1  1  0
```

This is 6, one in the 4s and one in the 2s. Converting to binary is just as straight forward, say we want to convert 14 to binary:

```
8  4  2  1
```

Well, the first column heading, 8, goes in to 14, so put 1 under that column. Subtract the 8 from the 14, which leaves us with 6. 4s go into 6, so that a 1 under the 4s which leaves us with 2. That is one under the 2s which leaves us with nothing, so a 0 under the 1s. The binary result is:

```
1  1  1  0
```

With four column headings we are limited to numbers in the 0-15 range, but we can easily add more. After the 8s column comes the 16s, then the 32s, 64s and so forth. Just keep doubling it.

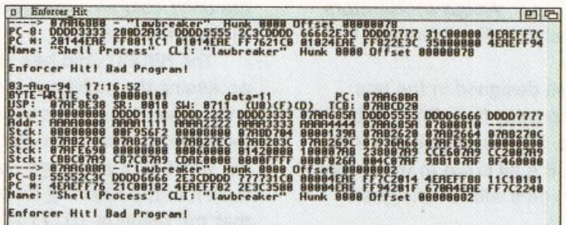
But in the meanwhile, back to our add instruction:

```
0000 0110 0011 1001 0000 0000 0000 0001
0000 0000 0000 0001 0000 0000 0000 0000
```

OK, we could convert this to decimal. If we did we'd end up with a pretty large number. Forty odd years ago programming was done in binary like this. You might have to set a whole load of switches to select which memory location inside the computer you would like to write to, (In binary, switch on = 1, switch off = 0), then the value you wish to write, then press a button to write it. A few knobs, and other buttons, and you could try running your program. If it went wrong, it was hell to find the offending instruction, as you would have to look at lots of little red lights, on for 1 and off for 0. No nice high resolution displays in those days.

Computer people are lazy, there is little point in doing work which you don't have to do, so before long, this programming technique was made easier by programming in first the octal, and then the hexadecimal number system. We'll skip octal (base 8), in these days there is little point in it. Hexadecimal, however, is much more useful. It is base 16, and has 16 digits, from 0 to 9 and then A for 10, B for 11, up to F for 15. Ah, that's interesting you might think, F is 15, which means every four binary digits can be represented in one single hexadecimal digit. Nice one, so let's now write our machine code instruction down in hexadecimal:

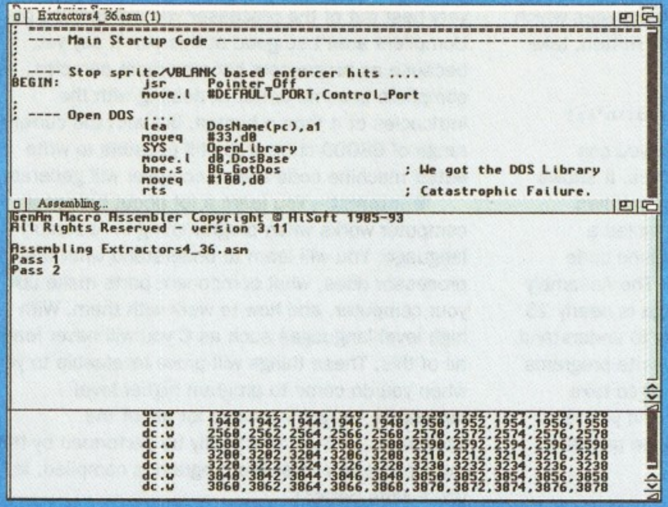
```
0639 0001 0001
0000
```



Enforcer is an invaluable tool for testing programs, as it can spot any illegal memory access and stop it crashing.

Ah, that's nicer. Indeed, we can see some of the instructions information in there. If you recall, we were writing the the value '1' into the memory location 65536. 65536, in hexadecimal is 10000. Let's break this instruction down. The first four digits are the instruction itself. 0639, in 68000 machine code means "add a value to a memory location", a memory location consisting of eight bits worth of data in this case.

Eight bits are referred to as a byte (which means that two hex digits are a byte, so our instruction takes up eight bytes of memory). The next two bytes of our instruction, the 0001 is the value we wish to add, 1. The next four are the memory address we wish to write to, 10000 in hex. We could easily modify this instruction:



The DevPac assembler package in action, trransforming the assembler listing (which humans can read) into machine code (which computers can read).

```
0639 1FE0 0001 A000
```

This writes the value 1FE0 (8160 in decimal) to the memory location 1A000. Great, machine code looks relatively easy, only there are many of these instructions, and you couldn't possibly hope to remember them all. Incidentally, in order to help differentiate hexadecimal and binary numbers from each other, we put a $ in front of a hex number, for example $1FE0.

So, we've made our machine code program a little easier to write – we would enter hexadecimal into a keypad, and some electronics would convert that to machine code. There might even be a program inside the computer already written to help us with the easy entry of data into the computers memory. This is all well and good, but numbers like 0639 for one of the many versions of ADD are a little hard to remember, and imagine if you had a program consisting of 30000 lines of machine code, that's a lot of hexadecimal digits, you are bound to make a mistake eventually. A much better approach, is for us to write our machine code in english, and for the computer to do the hard work:

```
add.b #$01,$10000
```

This looks a little more understandable. We have substituted the instruction "0639" for the word "add", which means add something to something else. The .b means we are talking to a single byte. The 68000 series of processors are 32-Bits inside (the older 68000 processor is technically a 16-Bit processor to the outside world, but on the inside it's 32-Bits), which means it can process 32 Bits of information in one go, four bytes. We can specify if we wish to deal with a full 32-Bits (a long word), 16-Bits (a word), or 8-Bits (a byte) processor. We'll come back to this.

Then we specify that we wish to add the value 1 to something (the # sign means that we are dealing with a literal value rather than information which has to come from somewhere), then we specify the address, $10000. This is Assembly language. When we have written our program in Assembly language, we run a program called an Assembler which will convert it line by line into machine code which the microprocessor understands. This makes the programmers life a lot easier.

Of course, development didn't stop there, things could be made simpler still. Assembly language is very straight forward, each instruction is translated directly to one machine language instruction. If your Assembly program consists of five instructions, the result will be five machine

code instructions. An Assembler is effectively a very powerful translator. Computer languages which were even easier to understand were written, take a look at this simple C program:

```
#include <stdio.h>
void main(void){printf("Hello world!\n");}
```

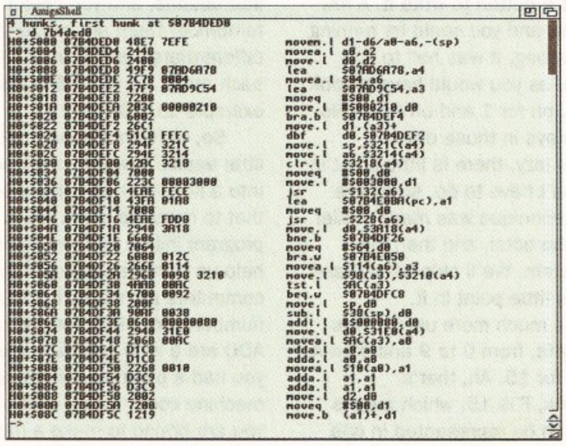
Even if you cannot program in C, you can probably guess what this program does. It shows the words "Hello world" on the screen. When you've written it, you run a program called a Compiler, which converts it into machine code ready for the microprocessor to run. The Assembly language version of this for the Amiga is nearly 25 lines long, and a whole lot less easy to understand. So why do it? Why force yourself to write programs in Assembly language which are going to take longer to write, be harder to follow, and you're more likely to make mistakes in? Good question.

WHY ASSEMBLY?

Why Assembly is something that's worth asking yourself. If you are learning programming to write some utilities, and maybe the odd small application which opens a few windows and does some simple things, then maybe you ought to be learning C. Let's have a look at the advantages of Assembly language:

- **Complete control** – You know exactly how many machine code instructions are generated by your program. For a language such as C you do not know how many, or which, machine code instructions are going to be created from your C code.
- **Compact** – Well written programs in Assembly language end up taking less space inside the computer than those in other languages, generally. The C program to say Hello World, when compiled directly with no optimisations comes out at just under 10,000 bytes. The machine code equivalent is under 200 bytes.
- **Speed** – Because of the level of control you have you are able to optimise code to make the very best out of the processor you are running on. Compilers aren't so good at this yet. (I say yet, because as processors become more complex, compilers become better at dealing with the intricacies of it than a human, but with the current range of 68000 chips it is still possible to write better machine code than a compiler will generate).
- **Interest** – You learn a lot about how your computer works when programming in Assembly language. You will learn to understand what the processor does, what component parts make up your computer, and how to work with them. With high level languages such as C you will never learn all of this. These things will prove invaluable to you when you do come to program higher level languages, as you'll know a lot about the operations that will eventually be performed by the microprocessor after the program is compiled, ie, you'll write better C.

So, having decided we definitely wish to program in Assembly language, let's make a start.



Here's one we produced earlier. On the left you can see the Machine code and on the right is the assembler – for easy comparison.

THE MOTOROLA 68000 CHIP

Depending on which Amiga you have, you will have one of five basic flavours of 68000 inside your computer, and one of many variations of it: 68000 (Inside the A500, A2000 and A600), 68010, 68020 (Inside the A1200), 68030 (A3000 and A4000/030) and finally the 68040 (Inside the A4000/040). By the time you read this, the very first of the mega-fast 68060 Amiga accelerators will start to become available. For reference, let's look at the 68000 Chip.

The 68000 Chip was designed in the late 1970s to provide a jump away from 8-Bit to 16-Bit technology for Motorola. So, what is all this 8 and 16-Bit stuff then? Well, it's all down to the amount of data a processor can deal with at any given time. Amongst the many pins on a 68000 Chip, 16 of them are dedicated to the transfer of data to and from other chips in the computer, such as memory for example. Because each of these pins can only carry a 1 or a 0, you'll see that it can read or write 16-Bits at a time, or a single word. This is what makes the 68000 a 16-Bit microprocessor.

Motorola, however, were very clever – although it was 16-Bits on the outside, they made it 32-Bits on the inside, so that they could expand the range later and provide a full 32-Bit Chip, which they first did with the 68020, 68030, 68040 and now the 68060 Chip.

Out of the 64 pins on a standard 68000 Chip, 16 of them are therefore for the transfer of data to and from other devices, in particular, memory. These pins, collectively, are called the Data Bus. So, what do all the rest do? Well, 24 of them are the Address Bus. So, what is an address bus? Well, each individual location of memory on the 68000 has a unique address. It has to, so that the 68000 Chip can specify which byte it wishes to talk to at any given time.

It's like street numbers – you might live at 57 Lobster Avenue, in the same way that a particular byte may live at memory location $1FE000. When the 68000 wishes to, say for example, read a byte of memory from a certain address, it uses the Address Bus to specify the binary address of the byte in question, and then the memory will return the value at that location on the Data Bus. The whole operation is controlled from the 68000's Control Bus, which contains special pins to specify things like "I want to read some memory please", and "I want to write some memory".

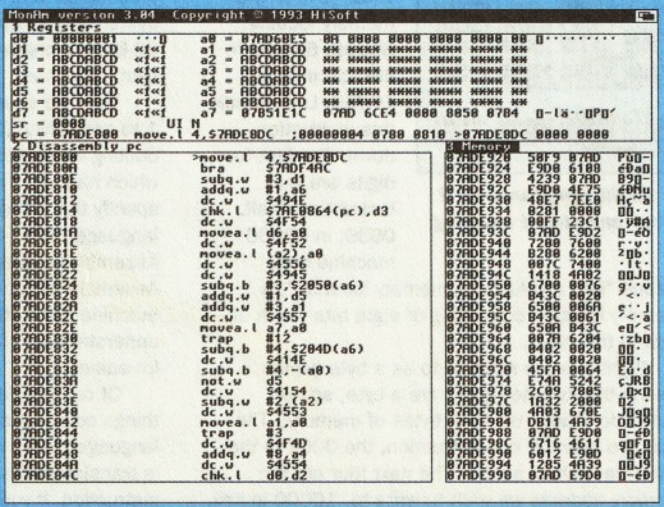
Typical isn't it, you wait all day for a bus, and three turn up at once (some of these old jokes are worth bringing up for air occasionally)(No they arn't Ed). The remaining pins on the 68000 are for supplying its power supply. One brief visit back to the address bus, you will recall that on the 68000 Chip there are 24 pins in it. Actually, to confuse you, there are only 23, numbered from 1 to 23. Because the 68000 is a 16-Bit processor it does not access individual bytes, it accesses words, so the units column (which would be address bus pin 0) does not exist.

The 68000 Chip has special control for accessing the individual bytes in a word. Anyway, let's assume 24-Bits on our address bus, what is the largest number we can represent? 24 binary 1s, which is a very large number indeed. If you work it out, converting it back to decimal, you'll see that the result is 16777216 bytes of memory, which is the maximum amount of memory a normal 68000 can support. Since 1K is 1024 bytes (2 to the power of ten, $400 in hexadecimal, 10000000000 in binary), we can see that this is 16384K of memory, or 16 Mega Bytes total.

Those of you who have fallen asleep by now may not have noticed that 1K (Kilo-Byte) is 1024 bytes rather than 1000. This is simply because 1000 is not a very round computer number, it is 1111101000 in binary. You'll notice that all the "Magic numbers" in computers, such as 8 Mega Bytes, 512K, and so on are all powers of two, nice round computer numbers.

We digress, back to the 68000 Chip. So we've established that the 68000 Chip has a 16-Bit data bus, and is capable of addressing up to 16 Mb of memory. The 68020 has a full 32-Bit address and data bus, incidentally, so those of you with an A1200 have a full 32-Bit processor capable of addressing 2 to the power of 32 bytes of memory (4 GIGA bytes!), which you're unlikely to need, let

MonAm can take your compiled machine code and run through it, step by step, showing you exactly where your programs are going wrong.



THE 68000 RANGE OF MICROPROCESSORS

68000 – Where it all started. Internally 32-Bits, externally 16-Bits. It can address 16Mb of memory and executes just under 1 Million Instructions/Second (MIPS) when running with an 8Mhz clock.

68008 – A special low cost version of the 68000 Chip. It was used in the Sinclair QL computer, and although it is referred to as a 16-Bit CPU, technically it's only eight bit as it only has an 8-Bit data bus.

68010 – Special version of the 68000 Chip designed to work in multi-tasking environments where the processor pretended to be lots of processors (each program running thinks it's running on its own 68000 Chip). Also slightly faster than the 68000 Chip, with some complex instructions such as multiply and divide sped up considerably.

68020 – Full 32-Bit version of the 68000 Chip. The EC (EC stands for Embedded Controller, a special cheaper version of the Chip designed to be used in video recorders and washing machines!) version (as found in the A1200) can only address 16Mb of RAM, but the full 68020 Chip can address 4 Giga Bytes.

The 68020 has, in addition to the registers, another chunk of ultra fast RAM built in to it called a Cache which enables the processor to work much faster in certain circumstances.

68030 – This is an upgraded 68020, with larger caches. It is faster than the 68020, and contains a memory management unit (MMU). (Although the EC version as found in the A4000/030 omits the MMU unfortunately). MMUs are used for many things, on Amigas they can provide virtual memory; where a chunk of your hard disk can pretend to be RAM. The GigaMem product does this. MMUs are also useful for developers as they allow you to detect when a program has accessed memory that it ought not to have.

68040 – Comes with MMU, improved caches, and built in Floating Point Maths unit (FPU). As found in the A4000/040.

68060 – The latest, and last in the 68000 series. This is an ultra fast processor, nearly 100 times faster than the 68000 Chip found in the A500, and three times the performance of the 68040.

It has two MMUs, and many other features, like a fully static design – meaning that when individual parts of the processor aren't in use, they do not draw power, making it ideal for portable computers which run off batteries.

alone afford! There are two basic types of memory inside your Amiga, RAM and ROM. ROM is "Read Only Memory", and it is just that. You cannot write information to ROM; its contents are set when it is manufactured.

All of the machine code programs necessary for your Amiga to work are placed in this ROM. It is often referred to as the "Kickstart ROM", as it contains the Kickstart software. Owners of 1.3 or below of the Amiga operating system have a 256K Kickstart ROM, and should upgrade to 2.04 or 3.1 if they are able to. 2.04 up to 3.1 have a 512K (half a mega-byte) ROM, as there is more features.

CD32 owners out there have a whole 1Mb ROM to hold all that additional stuff to handle the CD drive. ROM is special because when you switch your computer off, its contents remain intact, it is non-volatile. RAM (Random Access Memory), on the other hand is different. You can read and write to RAM, and when you switch the power off, unless it is battery backed up, the contents are lost. If you own an unexpanded Amiga A1200, you have 2Mb of RAM, and 512K of ROM inside your computer. The 68000 Chip itself is a simple beast.

So, how does it work? Well, when you switch it on, it sets an internal counter to zero, this is called the "Program Counter", and is used to tell the 68000 where the next machine code instruction is in memory. It then fetches the instruction word at this address (this could be any machine code instruction, such as the $0639 ADD instruction we showed above), and then executes it. In the meanwhile, the program counter (PC) is incremented to point to the next instruction, and so the process continues. This is called the Fetch-Execute cycle. Modern CPUs such as the 68020 have additional gadgets inside the processor to speed up this process, but they aren't important to us at this point.

As well as the PC, the 68000 Chip contains several other internal storage locations, called registers. All of these bar one on the 68000 are 32-Bits. They are just variables which instead of been held in main RAM, are held in a tiny amount of RAM which is inside the 68000 Chip itself. Access to these registers is far, far faster than accessing main RAM, so as we learn Assembly language, you'll learn the importance of making the most of them. Motorola were very generous when giving out registers, there are 8 general purpose registers called the Data registers. These are numbered D0 to D7.

In addition to these, there are 7 address registers, A0 to A6 which can be used by the programmer to store addresses. The A7 register is special purpose, it is called the Stack Pointer (SP). We'll get to this next month. Finally there is the PC, of course, and the status register which is only 16-Bits long. The Status register (SR) contains special information about the current microprocessor status, such as "The last arithmetic operation caused a carry". We have a small sprinkling of 68000 Assembly language, we do know one instruction, so just how easy is all this then? Well, if you've followed the above, really easy. Have a look at this:

Machine Code	Assembly Language	
203C00000000	move.l	#$00,d0
2E00	move.l	d0,d7
068700000001	add.l	#$01,d7

I've put the machine code next to the Assembly language instructions, so that you can get used to the relationship between the two. So, what do you think that the D0 and D7 registers contain after these three Assembly language instructions have been run? We've introduced a new instruction here, move. The .l is used to specify that we wish to talk to a full 32-Bit long word. Move is a very important instruction, it enables you to move data from one place to another. That can be from register to register, register to memory, memory to register and so forth.

So, the first instruction moves the literal value 0 into D0. D0 now contains Zero. We now move the contents of D0 to D7. D7 now also contains Zero. Then, finally, we add the literal value 1 to D7. D0 contains 0, D7 contains 1. OK, so it didn't do anything exciting like print "Hello World" on the screen, but it is our first Assembly language program. Now we're ready to make a start, so we'll need to get some software together, including that all important Assembler.

THINGS YOU'LL NEED

In order to program in Assembly Language, there are a few things you'll need. Firstly, and most importantly, you'll need an Assembler. I'd recommend HiSoft's *DevPac 3* Assembler. This is a powerful, and easy to use application which is ideal for beginner and expert alike. It comes with the Assembler itself, a text editor in which you can write your code, and a debugger allowing you see what your program does step by step. On top of this, it comes with the all important include files which contain special information which allow us to talk to the Amiga operating system.

Earlier versions of *DevPac* have been given away on cover disks in the past, but if you're serious about Assembly Language it's worth buying *DevPac 3*. There are other Assemblers available, owners of SAS C have an Assembler supplied with their compiler, and there are several Public Domain Assemblers available: a look through *Amiga Shopper* (don't forget to check out the Market Place section on page 42-43 and the UK PD Houses on page 92) should show a couple of PD libraries with Assemblers.

Other than this, I recommend that you consider getting the Amiga Developers Kit, version 3.1. This is available from Commodore at the cost of 23 pounds, and comes complete with the very latest disk based reference for every library function, heaps of example code, utilities, debugging tools... essential for every developer. If you're interested, you can send a cheque for 23 pounds made payable to "Commodore Business Machines (UK) Ltd." to:

Sharon McGuffie
Commodore Business Machines (UK) Ltd.,
Commodore House,
The Switchback,
Gardner Road,
Maidenhead,
Berks
SL6 7XA

Include a covering letter explaining that the cheque is for the 3.1 Amiga Developers Upgrade. If you're serious about Amiga development, you might also like to enquire about becoming a registered developer at the same time. For this series, I'll be using the *DevPac* Assembler and *MonAm3* – the Debugger supplied with it, although if you have a different Assembler you shouldn't have any difficulty using that instead. AS

WHAT
DevPac 3:
Assembler for the Amiga – £69.95, plus £2.00 postage
WHO
HiSoft
WHERE
HiSoft ☎ 0525 718181



The road to success

Craig Collins is a dynamic Amiga 3D animator. Graeme Sandiford met up with the man himself to find out what his secret to success is.

> "Craig's work is proof of what anybody with any artistic talent and perseverance can achieve – without thousands of pounds worth of equipment."

It is a well-known fact that the Amiga is incapable of producing graphics that are of a high enough standard for TV productions. Sorry to scare you like that, but I'm sure you are as fed up as I am with being fed that the Amiga is great for producing amazing images – I already know that. That's the reason I bought one and why I'm proud to be working on the best non-games Amiga magazine. Hopefully, that first sentence has also got rid of those people who think they can buy a copy of *LightWave* and be transformed into Ron Thornton overnight.

Craig Collins is a young man who knows how much hard work and practice it takes to get anywhere near that level. If you are into animations, Craig's name will already be familiar to you. He's the person behind such mind-blowing animations as *The Last Stand on Hoth* and *CD32 Mean Machines*. He has also just produced an excellent video (see this issue's *Window Shopper* for a review) as well as producing our fabulous cover image. The quality of his animations are phenomenal – featuring incredible effects, plenty of action and, most of all, good storylines.

However, the thing that has made his creations to date even more impressive is the equipment and software that he uses. While many of the professional companies such as Amblin and Foundation Imaging have huge rendering "farms" comprising several networked Video Toasters, Craig works with only a standard Amiga.

Craig has an A2000 equipped with 16Mb of memory, the built in ECS graphics chips and only a 52Mb hard disk! What's more, all of his animations have been created using *Imagine 2*, a program that almost everyone has (since it was given away by *Amiga Format*). Craig's work is proof of what anybody with any artistic talent and perseverance can achieve – without thousands of pounds worth of equipment.

After receiving a copy of Craig's *Imagine* video and being suitably awe-struck, I decided to go up to Normanton (West Yorks) to speak to Craig and find out how he went about making the video and to find out more about him.

THE MAN HIMSELF

Although Craig describes himself as being far from a perfect student, he did leave secondary school with two A-levels and eight O-levels. Despite his academic success, he spent a year and a half searching for a job. He is now 26 and works part-time in a warehouse, and spends the rest of his time working on animations.

How did you first become involved with Amiga 3D graphics?

Like a lot of people I bought a 500 to play games, then a friend showed me *Sculpt 4D*. I used that and fell in love with 3D. Then I started buying more and more equipment – faster accelerator cards, more memory and moved up to a 2000. On the software front, I got into *Turbosilver* (the predecessor of *Imagine*).

Where have your creative influences come from and has anyone really inspired you?

Like almost everyone in our age-group I watched and enjoyed films like *Blade Runner*, *T2*, *Aliens* and the *Star Wars* trilogy of course. So, I guess people like Ridley Scott and James Cameroon – they're the main two – have influenced me. It's the look of these two directors' work – they have a grunginess about them. It's that grunginess that attracts me. The Star Trekky clean look, which I don't think will exist, doesn't appeal to me at all – I go for the dirty look.

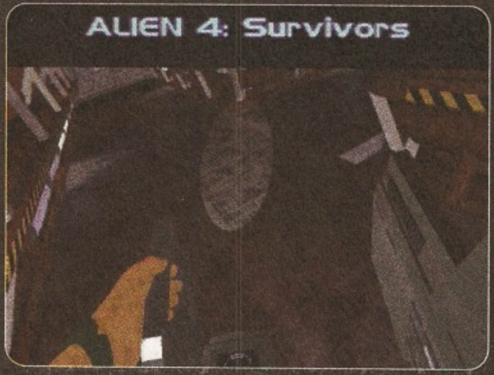
I like Ron Thornton too, he's the kind of animator I would like to be – to me, he's a god. I think the job he's done with *Babylon 5* is absolutely amazing and that's why I've just bought *LightWave*. I also hope to use this package to do logo animations for companies.

Anime has been a big influence as well; I am especially a fan of the *Bubblegum Crisis*. The powersuit used in *Soldier X* was actually based on the Boomer units from that series. A lot of people think he was based on the Guyver, but I'd actually designed *Soldier X* a few months before I actually saw the Guyver. Sonoda Kenichi, the Character Designer for the *Bubblegum Crisis*, is another god. Of Course Akira was a big influence too.

John Lasseter is an animator who has had a big influence on my work. He told me, basically, don't always move your camera around, and that characters, screenplay and stories are the most important aspect of animations. That's why my animations are story-driven, they are not just a sequence of flashy images.

Whoa! That's quite a list. Moving on to the video, what hardware did you need to create it?

I used my Amiga 2000 with a Progressive







Peripherals 040 card, 16Mb of RAM, my tiny 52Mb hard disk, two floppy drives and a Commodore 1942 monitor. In order to record the animations to tape, I used two Panasonic S-VHS video recorders. They both have an editing socket built-in. I also used an Amiga S-VHS PAL encoder – it transfers the pictures on to video. The editing system I used to control the two videos was a Centronics one.

What software did you use for the video?
The two 3D packages I use most at the moment are *Imagine 2* and *Imagine 3*. But, in the video I used *Imagine 2* about 95 per cent of the time and *Imagine 2.9* was only used in two or three places throughout the entire video. In my day-to-day use of my Amiga I also use *Directory Opus* nearly all the time. *DPaint IV* is also another important program, I use it to create brushmaps for objects and painting backgrounds.

For processing my animations I use *ADPro*, to compile animations I use *AnimBuild*. For producing the video I also purchased *Scala* – I used it to transfer the animations to tape. I used it because it can play animations automatically in interlace mode, and it is quite fast too – faster than *DPaint*.

I use *Essence* textures extensively as well. Mainly for simulating fires and other effects. If you look at the corridors in *Soldier X* and *Aliens*, you'll see that they're absolutely filthy – I used *Essence* textures to give that impression. One of the things I noticed, and liked, about the *Aliens* film was the way the whole complex was an absolute mess. I wanted to try and create the same kind of look and "feel", and get away from the clean, plastic look of most 3D-generated images. I found that the fractal textures produced a satisfactorily dirty and weathered look to the models. The fire effect was also an *Essence* texture – it really worked well. To actually model the flames would obviously have been difficult and the textures worked well and quickly. A lot of people who had *Essence* were surprised when I told how I made the effect, mainly because they hadn't read the manual thoroughly enough – a common problem.

So why did you decide to make the video?
Well I'd built up my equipment bit-by-bit and I thought "why not put it to good use?" I couldn't do PD animations any more, basically because I can't afford to. They are very complex animations and take up too much time and effort. In the end you're not getting paid for it and I'd rather spend my time doing professional work. Plus, I'm 26 now and I don't want to work in a warehouse for the rest of my life – I've got my future to think about.

Of course I don't regret doing my PD animations, because it was good ground work in the art of constructing animations. The first animation I did was *Dolphin Dreams*, which was a quick 3-second animation, and from then on I improved my skills with each animation I did. Each one became a little more complicated as I learnt more and more about story-boarding, shot-by-shot design and camera angles.

I would advise anybody who is thinking of doing professional work to try out their ideas in the same way and improve on them project by project. That way you learn as you go, your confidence will grow and then you'll be able to tackle major projects. If you have too big an idea to start off with, you hit a stumbling block straight away. If you want to get really good at something you have to practice and most people just don't want to put the work in – you've got to put the work in to get something out.

Another reason for doing the video is that it gives people with only 1Mb-machines the chance to view some of my more complicated animations. They can show it to their friends, without lugging their computer around, and say "look this is what the Amiga can do!"

What's your all-round favourite 3D package?
Well, it's got to be *Imagine* – I've been using it since version 1, updated it to 2 and now to 3. I've always been a big fan of the program; it's a powerful package and since I've gone through the learning curve, I find it very easy to use. But I can understand that a lot of people may find it hard to get to grips with. I had a quick look at *Real 3D 2*, but it was too complicated – you had to be a programmer to get the most out of it. Artists are artists and programmers are science people – graphics programs should be.designed for artists.

That's why *LightWave* is so good; that's exactly what Newtek have done – they've made a 3D program for the artist. It's so easy; I've only had the program for a week and I already know how to use the Layout editor effectively. It's like chess though – now that I've learnt all the moves, I've got to learn how to master it effectively. It's the same with *Imagine* of course, but it took that much longer to learn all the moves.

What's the one piece of hardware, aside from your Amiga and monitor, that you just couldn't live without?
My accelerator card. *Do not* go into 3D without an accelerator. Don't even bother buying the integer version of a program – you have to leave the machine on overnight to render even simple models. I couldn't stand it, that's why I had to buy an 020 chip to speed things up. I was scared to death that my current board is going to break down, but I have had three or four, and none of them have ever broken down.

So what does the glorious future hold in store for Craig Collins?
Hopefully I'll be able to make animating my full-time profession. I might even consider moving over to the States, although I'd prefer to stay in the UK. At the moment I am looking for as many small projects as possible so that I can get enough cash together to build up my system – things like doing company logos, or perhaps freelance work for CD games companies.

Then I'll be able to move on to bigger things – eventually I'd like to start my own company and do TV work.

If you had never met Craig or seen one of his animations before, you might be excused for thinking that he was being a little over-ambitious. But having met him and seen his dedication, enthusiasm, immense talent, and the brilliance and genius of his work, he has every chance of succeeding – it would be a true loss of talent if he didn't. As Craig said, he is looking for work, so if you are in need of a fantastic computer animation of the highest quality, contact Craig by writing to him at this address:

25 Jubilee Avenue
Normanton
WEST YORKS
WF6 1DJ AS

"I like Ron Thornton too; he's the kind of animator I'd like to be – to me, he's a god. I think the job he's done with Babylon 5 is amazing and that's why I've just bought LightWave."

7 Steps to Animation Heaven

1 When building models, only build what is going to be seen by the camera.

2 If you are going to produce a hi-res or 24-bit images, use algorithmic textures rather than brushmaps.

3 Don't move the camera to try and achieve dramatic effects as this will increase the size of the animation and reduce the playback speed.

4 Brushes are important – if used properly they can add detail to an object that isn't really there.

5 If there is an object that suits your needs, use that rather than build your own. This is especially true of scanned objects, which you can't model any better yourself.

6 Be original – combine ideas and give them a new slant.

7 If your animations contain several complicated objects, use dummy objects to test your animations. This will save on valuable rendering time.



How was it made?

This stunning image was created on an Amiga by one of the rising stars of the 3D-graphics world – Craig Collins. So, how was it made?

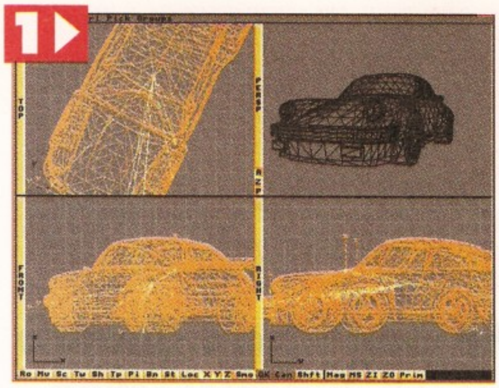
No, I am not going to write anything for the next five minutes – just close the magazine and stare at the cover for a while. Beautiful, isn't it? It's been generated on an Amiga too and by one of the most promising 3D-artists around – Craig Collins.

But, how did he create the image; what sort of secret methods did he employ to get such good results? Well here is your chance to find out; we're devoting two pages to explaining how he went about it – what techniques he used and what software. We have also included a selection of Craig's favourite tips for budding animators.

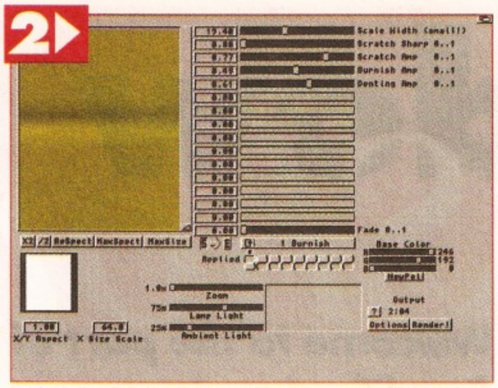
If you've not heard of Craig before you might like to first turn to the interview we had with him on the previous two pages. He's an Amiga 3D-artist and animator who mainly uses *Imagine 2* for producing his work. For the cover image he also made good use of some of *Imagine 3's* new features. Although you won't have seen his work on the cover of magazines before, you soon will – remember you saw him first in *Amiga Shopper*.

Although you may not feel like undertaking such a mammoth task yourself, some of the techniques we will discuss can be applied to any raytracing project. The demands on your machine should not be too much and will depend greatly on the complexity of the models you are using. If you are after some free models you could try searching a few BBSs, PD libraries, or, if you are a subscriber, you find an object on almost every subscribers' disk.

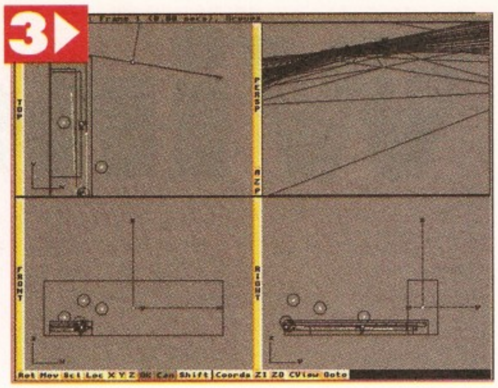
If you would like to include similar car objects on future disks, why not give us a call, or alternatively, write to us?



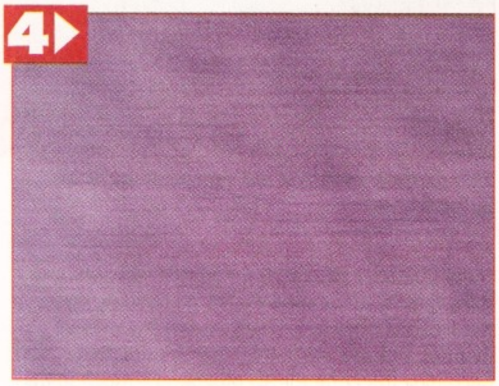
The first task I had to perform (after being informed of what type of image was needed) was to select appropriate models. There were to be three cars in all; two were to be in the foreground and another to be placed further back down the track. Considering the positions, I picked two highly-detailed cars for the foreground and a less detailed object for the background. The models were of a Porsche, Ferrari and a Corvette.



Obviously dull-grey cars would be far from exciting and unrealistic, so I gave them both metallic attributes – they were more or less the same, except for their base and specularity. I also applied a burnished texture to the body shells of the cars to increase their metallic appearance. This also stopped them from looking too plastic which often is the case in raytraced images. All of this was performed in the Detail Editor.



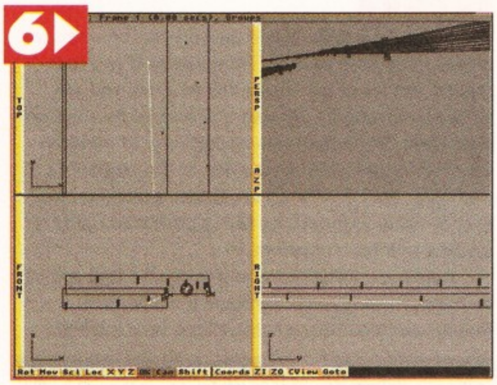
Rather than have the cars suspended in mid-air, a track was built for them. The road was basically made from flat plane. After loading the track into the Stage Editor it became obvious that a straight road lacked dynamism and would take up a lot of rendering time. I decided to bend the road to the left and give it a banked curve. I used Imagine 3.0's new States tool and its deformation functions to do this.



To make the road more realistic and interesting, several attributes needed to be added. The road's appearance is more important than you might first think. Firstly, the cars' metallic attributes would reflect the road – it would also act as a set or a stage for the models. A dashline was added as a brushmap. A ribbed texture was applied to the tarmac area of the road to give the impression of speed. A bump map made it more realistic.



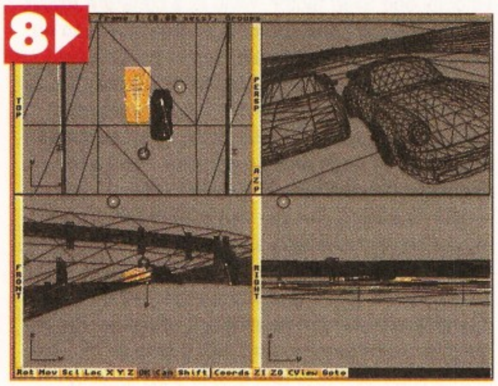
As the cars' environment was to be an outdoor one, a suitable outdoor image was required for the background. I had quite a nice image of clouds on a blue sky, so I decided to use it. Rather than adding it as a background image in the Action Editor, I decided to map it on to a simple two-polygon plane. I did it in this manner as it would give me greater control of the image, so I could angle it to increase the impression of speed.



For the crash barrier I used the States function again. I made use of a snapshot object from a stage of the road. These were made into a path. I then created a profile for the barrier. This profile was then extruded along the path. This same process was used to create the inside barrier. After making some adjustments manually, I gave the barriers a metallic attribute. They were also given a fractal texture to appear worn.



Next came the logos; the Blizzard and GVP images were scanned in, while the Amiga Shopper logo was converted from an image that already existed on a Mac. All three brushmaps were applied using the States function once again. This enabled me to apply them in a way so they would follow the contours of the objects. They were also genlocked so that the surface attributes of the objects below could show through.



After all the objects had been completed, their attributes set and the brushmaps applied, I returned to the Stage Editor. During all the previous steps I had been going to and fro, performing quick renders to check the appearances of the objects. Now I made my final alterations and added my light sources. I also found a dynamic camera angle – close to the cars with an upward angle.



The image above is one of the early previews that were sent to Rich Baguley at Future Publishing via a modem. Once my machine had rendered them in Scanline mode I sent them to Rich and received suggestions on what could be improved in the image. Once we had a result we were all happy with, I set about rendering the final image. This was done in raytraced mode at a resolution of 1600 by 1000 and took 53 hours to complete!

Window Shopper

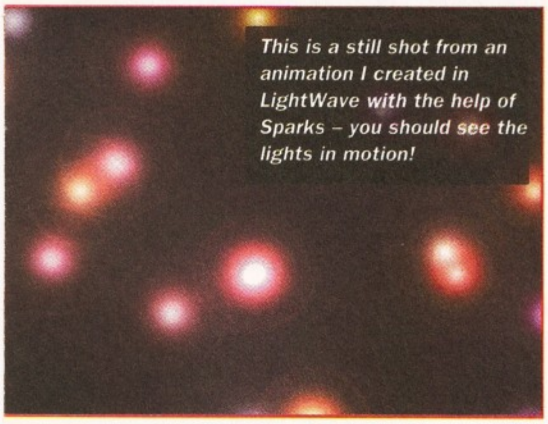
Welcome to the part of the mag where Graeme Sandiford reviews some small, but interesting, products we couldn't fit in elsewhere.

We have a great range of products this month. We introduce a full-blown particle animation system, we have some of the best Amiga animations captured on video and we've also got a heart monitor.

SPARKS

Sparks is a *LightWave* add-on that can be used to create incredible particle animations. If you're a regular reader of the mag's PD section, you will already know that I will use any excuse to mention *Star Trek*. So I'll take this opportunity to mention the wonderful Comet sequence at the beginning of the *Deep Space 9* TV show. Those sparkling bits that fly away to create its tail is produced using a particle animation system.

Could you imagine having to create that effect by hand, moving each particle? It would take forever and probably wouldn't look very realistic either. So what exactly *is* particle animation system? Well in its simplest terms it's a way of controlling the movement of several objects in a semi-random way. By semi-random I mean you have control over the general movements of the particles, but can add a random element.



This is a still shot from an animation I created in LightWave with the help of Sparks – you should see the lights in motion!

Sparks is such a system, it is meant to be used in conjunction with *LightWave*. To get the best out of the system you need at least 13Mb of memory. This is so you can run both programs at the same time. If you do so, the programs can communicate via ARexx to work in concert.

This is the best way of using the two programs, but if you are short on memory you might consider running them separately. Although this is possible you do lose some of the *Sparks*' functionality, such as performing renders while working in *Sparks*. You can save and load scene files between the two and in this way keep your memory usage to a minimum. However, this method can be a real pain at times, as you have to keep quitting programs, whereas if both were running at the same time you could switch back and forth easily.

Of course, the true measure of a particle system is how much control you have over the particles. The movements of *Sparks*' particles can be control in a number of ways.

One of the methods I found most impressive is the program's Source Object function. You can have particles flowing from the points of one object to the points to another object. This produces a stream of particles that move from one object to another. You could even have particles in one shape changing to another.

Another impressive, but not so unique, control method is Flocking. This will set the particles swirling about a point while avoiding collision with each other.

Track *LightWave* Motion File is yet another powerful tool. This function emits particles from a single point along a motion path. This could be used to produce the wonderful comet effect we mentioned earlier.

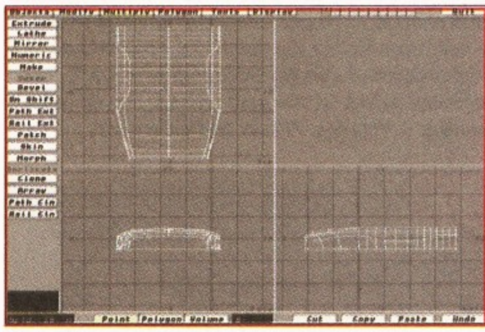
Most of these functions can also be affected by other environmental factors. For example, they can be subject to gravity, air drag or wind. This can be used to provide almost endless combinations of effects and simulation of real-world phenomenons such as snow.

Among the other pre-programmed effects you will find are Wind Velocity, Gust Velocity, Flake Velocity and Swirl factor. Wind is a constant factor which will effect each particle equally; this can be used to move all of the particles in a particular direction. Gust, like Wind, is applied equally but is not a constant force, rather it will increase and decrease in intensity. Flake Velocity is calculated differently for each particle and can change in intensity and direction. The Swirl Factor is very similar to flaking, but you can control the movement by creating a swirl radius and by setting a speed value.

There are loads and loads more features to this program, but I'm running out of space. So let me just conclude by saying that this is a frighteningly powerful tool that is easy to use, affordable and any professional *LightWave* users who don't have this program are seriously limiting their animation potential.

Product: Sparks
Price: $99 (approx £70)
Supplier MetroGrafx (UK supplier to be announced)
Tel: 0101 810 693 5134

Overall Rating 96%



This partially modelled car was made by using spline patches.

ORGANIC MODELLING

Sorry to start a review on a negative vibe, but one thing that is guaranteed to get me bashing my head on my desk repeatedly is a poorly written manual. Unfortunately, this seems to be fast becoming the norm for 3D programs – much to my doctor's concern. *Imagine* and *Real 3D* are prime examples of this.

Often the problem with manuals is that they are poorly-structured, have poor tutorials, or simply do an insufficient job of explaining complicated procedures or concepts. *LightWave's* manual (the section devoted to it in the Toaster manual), although not quite as guilty as most 3D programs, is still far from perfect.

It covers most of the important features and even provides some useful hints and tips, but glosses over some of the more complicated techniques. Thankfully, as is often the case, a third party has released a series of books to cover the ground missed by the program's manual. One of the program's functions that has been a little neglected, one of its most powerful too, is spline-patches. This also happens to be the topic that is dealt with in the first of the series. Future volumes will cover bones, texture mapping, animation and creating hierarchical objects.

Organic Modelling deals with working with spline curves and patches. A spline curve is actually curved, unlike most curved shapes in 3D programs which are actually a series of straight lines that give the appearance of being curved. Spline patches are objects or surfaces that have been created from several spline curves. The simplest way to describe how spline patches are created is to liken the splines to skeletal structure from which a "skin" is formed, this "skin" is the patch.

The book is essentially a collection of four tutorials that show you how to make good use of this very powerful feature. Each of the tutorials take you through the exercises step-by-step and as

a result they are very easy to follow. They also make extensive use of keyboard short-cuts and, as a side-benefit, it also helps you to get into the habit of using the keyboard when it is quicker than using the menu system. Each tutorial has plenty of large annotated screengrabs that help illustrate complicated techniques or procedures.

The first tutorial serves as an introduction to how spline patches work. You are taken through the creation of a simple patch. The tutorial gets you to try out a variety of techniques; as you perform each one you will notice subtle and drastic changes that arise from using a different procedure on the same four curves.

The second chapter introduces the reader to triangular patches. This section goes deeper into options that can be used when creating a patch. It explains the importance of the order that you select the curves and how the knots and length settings will alter the construction of the patch. Part two of this chapter also explains how and when to use square patches.

The next tutorial takes you through the steps necessary to create a pair of lips. This section helps to explain how important the direction a polygon is facing is. The final chapter is the most lengthy and complicated. By the end of it you should have created a "seamless" hand. This tutorial explains the best way to structure your curves for modelling complex objects.

As a publication that sets out to explain how to use a powerful feature this is a tremendous success. Its instructions are clear and provide an insight into why you are asked to do something in a particular way. The only complaint I have is that, at £24.95 for just over 90 pages, it is too expensive. However, it is still an impressive book and I can't wait to have a look at the rest of the series.

Product:	***LightWave Organic Modelling***
Price:	***£24.95 (plus £1.95 P&P)***
Supplier:	***The 24-Bit Club***
Tel:	***041-946 2191***

Overall Rating: 86%

HEART TRACK

Being fat sucks... the media would have us believe that overweight people can't enjoy themselves, are unsuccessful and lazy. Despite the play on people's insecurities to sell products, being overweight can be damaging to your health. *Heart Track* is a hardware and software combination that aims to help people stay in shape.

High-street shops' shelves are stacked with work-out tapes from a number film stars, singers and models. It would seem that being healthy is big business now, so how do you know if you are getting the most out of your fitness routines? Well, one thing that can help assess your level of fitness is monitoring your heart rate.

By monitoring your heart rate and changes in it you can learn all sorts of things about your physical condition. It's commonly known that when your body is exercising and when it is at rest, your heart beats at different rates. If you paid attention to your science or biology classes, you'll probably be aware that the changes in your heart rate are more significant than the speed of the beats.

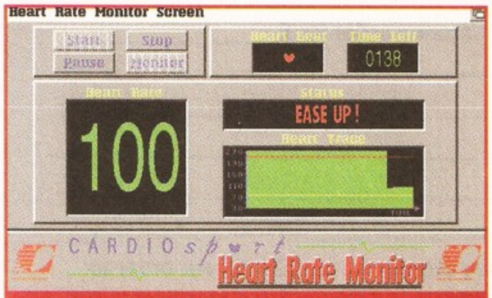
So what exactly is *Heart Track* and how does it work? Hardware-wise the system consists of two units – a transmitter and a receiver. The transmitter should be attached just below your chest – to hold it in place it has a special belt. The belt is elasticated, except for the section that is attached to the transmitter, to help make it a comfortable fit. The transmitter is attached by means of two "poppers", which are connected to the rubber electrodes on the inside of the belt. The electrodes need to be moistened before being attached to your skin. Once attached and activated the transmitter sends out a radio signal in response to your heart beat.

This signal is picked up by the receiver, which can either be positioned on a nearby surface or your wrist using the band supplied. The receiver is connected to your Amiga by a lead that plugs into the serial port. As *Heart Track* is designed to work on other types of computer too, its serial lead is of the 9-pin variety. Because of this a serial converter is supplied with *Heart Track*. Unfortunately, this means the lead sticks out a bit, an inconvenience if you have a cramped desk like mine.

The transmission range for this product is approximately 9 feet – more than enough for most people's needs. This is a combined distance derived from the receiver leads' length, five feet, and the maximum distance you can stand from the receiver, four feet.

The software is quite straight-forward. To the left of the screen you'll find a large counter – this displays the heart rate. To the bottom-right of this is the heart trace – this is more-or-less a real-time graph. There is also a little beating heart that grows and shrinks in response to your own heart rate. There is also a counter that shows how much time is left for this part of your work-out. The status window displays how well you are doing, if you're not exercising enough, it will prompt you with a "work harder" message; if you over-do it, it will tell you to take it easy.

Once you have completed your work-out, you can then use the graph that is generated by the program to try and gauge how successful it has been. This is all good and well but the manual doesn't make any attempt to tell you how to go about interpreting the information. I know the program doesn't claim to be a total fitness programme, but it would have been nice if it told you how to get the best out of the program. The price of the product is just too much, nearly £100, just to monitor your heart rate. The program does its job, but only a simple one – this is a product for only the most devoted of fitness fanatics.



Use Heart Rate Monitor to keep track of how effective your work-outs have been.

Product:	***Heart Track***
Price:	***£94.95***
Supplier:	***Healthcare Technology Limited***
Tel:	***0243 528800***

Product Rating 68%



This stunning image is just a taster of what you can expect from The Imagine Video Collection. This is taken from the Soldier X animation – just one of three all-new animations.

THE IMAGINE VIDEO COLLECTION

(by Craig Collins)

In my search for products for a small review I thought I would take a look at Craig Collins' *Imagine Video Collection*. The nice chaps at 17 Bit sent me the tape, which was left on my desk for a couple of days, went home with our Art Ed and then, when I decided I had 20 minutes to spare, I actually sat down and watched it.

In fact, after recovering from the initial shock, I watched it many times. I'd seen space wars before and thought it was okay, but this was incredible. Many of you have probably seen most of Craig's earlier work, so I won't bore you with a description of them. But let me just say that they have been greatly enhanced by the addition of sound.

Right, on to the new stuff. There are three never-seen-before animations which are all in colour and with sound. This is a direct benefit of working on animations that are to be released solely on video.

The first of the newies is *Soldier X*, which starts off with a pumping techno track. The story-line is based around a powersuit, which is stolen by a lab technician. It features some truly fantastic explosions and special effects. While the design of the suit is based on an anim character, it is very *Terminator 2*-like in several sequences. To my tastes this is the best one – an absolute stonker!

The Second is *Tigris 3*. It's a deceptively complex animation. It is basically a spaceship being launched from a hanger bay. But, it is very slickly done, with plenty of banking manoeuvres.

The third and our Art Ed's favourite, being an Aliens fan, is *Aliens – The Survivors*. The main thrust behind the storyline is that the "Company" return to the planet Acheron to search for survivors. It's moody, mean, grungy and suspense-laden. In the main sequence we are given an eye-level view of a colonial marine's journey through a complex. It's all hairy stuff with aliens jumping out left, right and centre – but at least he's got a motion-tracker and his trusty pulse rifle.

In conclusion, buy this video! If you don't, then you are probably more than a little funny in the head. If you can't afford it, sell all of your non-essential organs. Oh yes, Craig will receive a royalty for each video sold, so support one of the Amiga's most promising animators by buying one.

Product:	***The Imagine Video Collection***
Price:	***£12.99***
Supplier:	***17 Bit Software***
Tel:	***0924 366982***

Overall Rating: 93% AS

Know what I mean?

Discover what the top industry figures really think.

Marcus Dyson of Team 17 wonders why software arrives late...

Programs arrive late. It's a fact of life, like Biros disappearing even though you had them just seconds ago, or like there always being at one small screw left over when you re-assemble your Amiga. No-one knows why the release of a software package, that has been planned for a particular date for months in advance, inevitably misses that date, but I am going to try and explain it nevertheless.

You see, at one time, when I was editor of *Amiga Format*, it was my job to worry about software being late. My flatplan saw pages left aside for the impending release of *PageStream 3* month after month. But month after month *PageStream* failed to show up. And month after month I had to rely on the prodigious output of Power Computing to fill those empty pages.

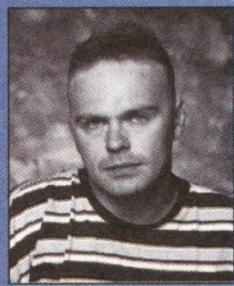
Now, in a hideous turnaround of circumstances, it is my job to ensure that software arrives on time. And not surprisingly, despite the best will in the world, it doesn't. And as an DTP using Amiga enthusiast, I am still waiting for *PageStream 3.0*.

But what can Soft Logik be doing with *PageStream* to make it be so long in coming? After all, I saw a version that I would have given my right arm (I am left handed) to take away with me at the World of Commodore show in New York in April 1993.

The answer, I would guess, is that they are improving it. Adding new features, perfecting old ones, making the whole thing run faster and smoother, with greater stability. Then there's always the great programming mystery of why adding one new function makes two old, but completely unrelated, features stop functioning. No-one knows why this happens either, but once it does it certainly increases development time.

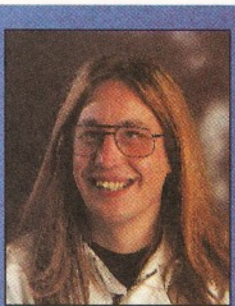
It's a very tempting thing to keep working on a project and forget about getting it on sale. The trade-off is a difficult one, release it now and face the slings and arrows of outrageous *Amiga Shopper* reviewers, or hold it back a while longer and make it that bit better. The really difficult bit is knowing when to stop developing and start marketing. In the safe world of games, it's easy - it has to be out before Christmas! But in with serious software, seasonal variations are far less important. Jeremy Rhill of Digita addressed the problem with *Wordworth 3* by setting a date, and saying that the program would be unveiled to the press and the public on that day. It was, and most people concluded that he should have held on a bit longer. Within weeks Digita issued another version of *Wordworth 3*, but on the big day, program-slip let them down.

So *PageStream* still isn't ready, and neither are *Pool* and *Superfrog* for CD32. But you can bet your bottom dollar that whatever package it is you are working on, there's someone at the software house (usually the project manager) just as keen to see it released as you are.



"You see, at one time, when I was editor of Amiga Format, it was my job to worry about software being late. My flatplan saw pages left aside for the impending release of PageStream 3 month after month."

Andy Braybrook speculates on who writes operating systems...



"If I am to use other people's code, and that thought doesn't exactly thrill me but I know I'll have to, then at least give me plenty of documentation and try and make it as user friendly as possible."

I'd like to have a brief word about operating systems. What I really, *really* want to know is this: who writes all this stuff? What kind of things go on in their brains? I mean, how can you make a simple keyboard-polling routine take so long, produce the answers you want in such an unhelpful format, and have such a clumsy calling convention?

The times they are a-changing, and we've come to an age where we no longer have the time to write our own operating systems for new machines and we have to rely upon the code of other's to get things done. It has got to the stage where the shelf life of a computer has become so short that it has been superseded by newer machines before we've written the first game for it.

When the Amiga was new we invested about 18 man-months writing our own operating system (well Dominic did actually) which would allow us to write essentially the same game code on an Atari ST and an Amiga with minimal changes. This was a good idea on two 68000-based machines and reduced the overall development time of each game by making the game code 'portable'. Our only alternative at the time would have been to use each machine's native operating systems.

Dominic probably went a little bit over the top in that he wanted full pre-emptive multi-tasking. He understood that games need to get things done as quickly as possible so he discounted Atari's TOS pretty quickly and AmigaDOS wasn't really up to the job either, so he just dived in there and did the whole job himself. So we were left with a pretty snazzy system that was modular and he knew exactly what it was and wasn't doing from one moment to the next, which is a great advantage.

Now with the accelerated lifetime of new hardware we are being told to use the existing operating systems on new platforms. We actually don't really have a choice as we aren't given the essential hardware information to go it alone, and we don't have the time to do the whole thing anyway. We have to hope that the hardware is fast enough to do things the slow laborious way that operating systems do. You see, they have to cover all possible options now and in the future and preferably have some error-checking, something that we can switch in and out if we write everything ourselves.

Which brings me back to my original point, what kind of people write operating systems? They have all this jargon trying to make things sound really grand, like Intuition Direct Communication Message Port, which is actually just a lump of memory with some variables and flags in it, as I understand it. Why not just say so? All this jargon just veils the whole thing in secrecy. If you want us to use the system then how about making it easy for us? I spent the first few weeks of *Fire & Ice* CD32 development building an interface for our game so that *Fire & Ice* could talk to AmigaDOS in sensible terms, with a lot of help from Mike Montgomery and Toby Simpson. Much obliged, chaps.

I'm not interested in File Locks and Handles, I just want to read a file into this wadge of memory, *now*. So how about providing basic low-level calls for the 99 per cent of cases where you only want the basic function. And as for polling the joystick, well. If the routines provided can cope with a joystick, game controller or mouse then how about passing the input back in compatible forms like my joystick read routine has to do? And what about the non-volatile library, that has some real eccentricities in it. Why tell it how long the save data is in lumps of 10 bytes? I have to take the raw length and convert it into 10 byte lumps every time, why can't it do that? Too tricky to write, was it?

If I am to use other people's code, and that thought doesn't exactly thrill me but I know I'll have to, then at least give me plenty of accurate documentation and try and make it as friendly to use as possible. Try and think what we might want to do with the operating system rather than how you can make a simple function fit in with your jargonese. A dictionary is no good if you don't know what you want to say. It's like going into a restaurant where the waiters are all penguins [Eh? – Ed], we're just not talking the same language. Our job is hard enough as it is without trying to understand someone else's tangle. AS

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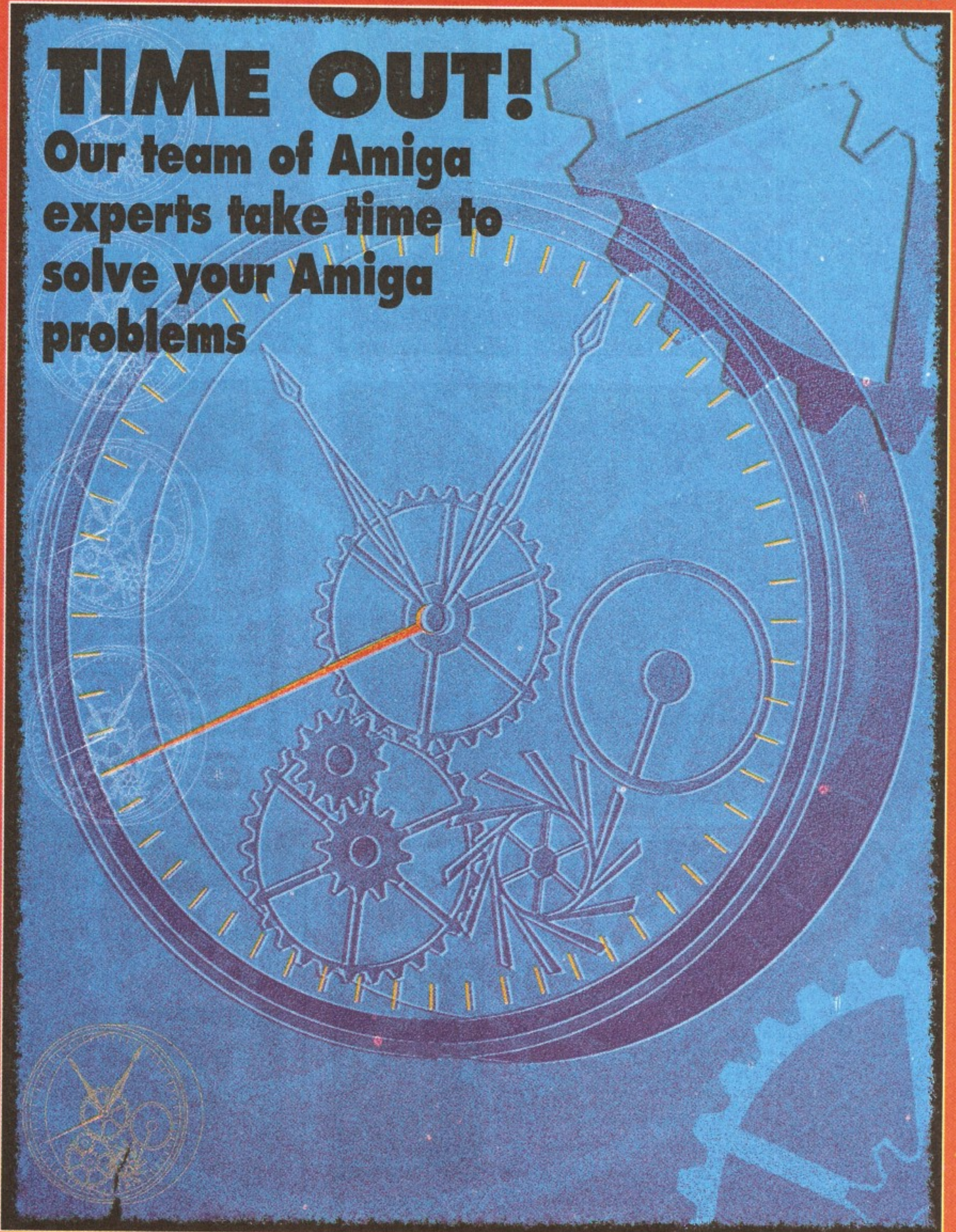
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OUR EXPERTS TACKLE YOUR REAL-LIFE PROBLEMS

TIME OUT!

Our team of Amiga experts take time to solve your Amiga problems



USING THE ICONS TO FIND WHAT A QUESTION'S ABOUT



Beginner questions raising basic problems.



General Amiga-related queries or questions.



Queries related to Amiga desktop publishing.



Questions about monitors and TV displays.



Queries relating to general hardware problems.



Questions asking for buying advice in any area.



Printers, drivers and hardcopy problems.



Coding problems (no matter which language).



Queries about using your Amiga with video.



MIDI, sampling, software and synths.



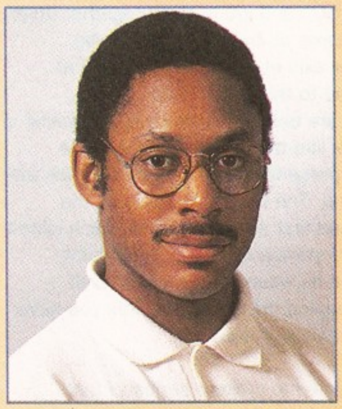
Software packages and programs queries.



Questions relating to comms, including modem.

AMIGA ANSWERS

NO PROBLEM!



Graeme Sandiford will soothe your mind and calm those tense nerves caused by your Amiga.

Hello and welcome once again, to the area of *Amiga Shopper* where you can turn to find all the answers to questions concerning your Amiga. It's my privilege, as *Amiga Shopper's* technical writer, to make sure that not one of your problems is left unsolved. Don't worry, we can help – no matter how simple or complex they may be. At *Amiga Shopper* we want you to get the very best out of your Amiga. That's why we devote more space than any other magazine to this indispensable service, so please make the most of it and keep your questions coming in. I will do my very best to find a solution to all your problems.

Don't worry if you come across any unfamiliar terms, just turn to one of our jargon-busting boxes to receive an explanation. The problems are put in a wide context for everybody's benefit. The index on the previous page is your guide to the topics covered this month.

By now, you are probably familiar with our team of Amiga experts. **Mark Smiddy** knows all there is to know about AmigaDOS and floppy drives. **Jeff Walker** is our desktop publishing, fonts and printer correspondent. **Gary Whiteley**, is a trusted expert on video applications and graphics. If you have a query about comms, we'll set our communications guru **Dave Winder** on the case. **Toby Simpson** is our code clinician. If you've got problems with anything from C to assembler, try taxing his little grey cells. Finally, we've got a man you can rely on when it comes to operating systems programming – **Paul Overaa**.

Don't be afraid to let all your queries, problems, worries, or general tips and hints come pouring in – they're what we live for. With a good tip you could be a tenner richer. Write to me and I will do my best to sort you out!

PLAY IT AGAIN SID

CODING

I am writing about a problem I have using SID (the directory utility). I have recently bought the CSA Derringer 030 Accelerator. I have been using SID since I bought my hard drive without problem, until I fitted the accelerator. Since then, it crashes the system with one of many Gurus. I have obtained a copy of SID2, and the problems still happen, if I try and view or hear a file.

Another problem, which I know you have answered before, is that I get a message "Pure bit not set" when booting from the hard drive. Unfortunately I can't find the answer!

Finally, I have never been able to get Virus_Checker to work on my system, it just crashes.

Russell Butler,
St Lawrence, Jersy

If everything else you use is working flawlessly, this points to SID. Personally I would recommend *Directory Opus*, the program is excellent, configurable and reliable on all processor configurations, despite the ego problem of its author! The errors you sent indicate that all sorts of nasty things are happening. I would suggest trying alternative software, or contacting the authors for advice.

The 'Pure bit not set' message comes from the AmigaDOS command 'Resident'. Resident allows you to pre-load several AmigaDOS commands (those that you use from the shell, such as Dir, Delete and Copy, for example) into memory. This means that you can use them immediately without the Amiga having to load them every time. The catch is, that since there is then only one copy of these commands in memory, that it must be possible each one to be run several times at once. This is where code has to be 'pure' (or re-entrant). If you have installed your software on the hard drive using the Commodore installation procedure, the Pure bit should be correctly set on all commands. Check what you are trying to resident, in your s:startup-sequence and s:user-startup. You can set the pure bit on a command using the Protect command.

With regards to Virus_Checker, there have been many reliability problems in the past with certain systems. The best recommendation is simply to try the most recent release. ***Toby***

A4000 ADVANTAGE?

HARDWARE

I do DTV and wish to upgrade from my A1500 (1+4Mb, 120Mb hard drive) to an A4000 so that I can incorporate DTP. Would there be any real advantage, considering the price, in the purchase of either an A4000/40T, A4000/40 or A4000/30?

I also wish to incorporate company logos into my videos and I am a little confused whether a scanner (mono or colour) or a digitiser is the best way to do this. Which would give me the best results and be most flexible for DTV and DTP work?

I am also looking to purchase a laser printer – what sort of memory would I need to use this type of printer to its best advantage?

Alan Evans
Dronfield Woodhouse, S. Yorks

In a nutshell the most significant difference between the A4000/40 and A4000/30 is processing speed, with the A4000/40 being the faster of the two. The A4000/40T tower (which seems to be in incredibly short supply) is similar to the A4000/40 except that it has a SCSI interface and more card slots, including two video slots for expansion cards. Of course the cheapest is the A4000/30, but you will have to add more memory to the basic machine (go for 6Mb minimum) and you may also require a SCSI card if you purchase a scanner has a SCSI interface.

Make sure that you also budget for a reasonably-sized hard drive (I'd recommend at least 200Mb, more if possible). On the other hand,

JARGON BUSTING

ARexx – Amiga REXX. REXX is a computer language designed for IBM mainframes in 1979, by Mike Cowlishaw at IBM. He wanted to create a language which was easy for people to use, rather than machine friendly. The result, REXX, was a powerful scripting language which was both easy to learn, and easy to use. William Hawes converted REXX to the Amiga in 1987.

This was then licensed by Commodore with the release of Kickstart 2, and has been included with every Amiga since the A500+. (Although the manual is not included with the A1200, for some strange reason – which is why a lot of users don't even know that they have this powerful tool!). 1.3 users are not excluded, ARexx is still available from William Hawes (In America) as a separate product, but if you're interested, it's best to upgrade to Kickstart 2 instead, as not only will you get ARexx, but you'll get a powerful upgrade to your operating system too.

PD – Public Domain. This is free software, software you can use without having to pay for. There are many public domain libraries out there which will do disks with software for a couple of pounds. The most famous PD library is the Fred Fish disks. These have been around for ages and ages, there are now over 1,000 disks of stuff, and if you have CD-ROM drive, you can get CDs with all of the Fish disks on them. A lot of other CD-ROM disks, such as Amathera's Public Domain Collection also include many of the Fish disks.

Closely related to PD is shareware. This is software which you can use for free (Although some features may be disabled), and you'll be expected to send the author some money to register it. It's always worth registering shareware programs that you use to allow the authors of them to continue developing for the Amiga.

I JUST CAN'T GET TO GRIPS WITH...

DEM BONES

I've been using *Imagine 3.0* for a few months now, after two years of using the previous version, so I wouldn't say that I'm a stranger to the workings of 3D software. But there is one important feature of *Imagine 3* that I just can't get to grips with. The Bones feature!!

Honest to God, I've read that section of the manual more times than I care to remember and I still can't make head nor tail of it. Just one of the inadequacies of the manual I think....Would it be possible for you to print a Bones tutorial for *Imagine 3* in *Amiga Shopper* some time? I think that there are a whole lot more people than myself who would appreciate it!

Jonathan McBrien, Drumclay, Fermanagh

I can certainly sympathise with your difficulties Jonathan, because I had pretty much the same trouble when I tried to follow the manual and find out how bones work. Eventually, after a lot of fiddling, the penny dropped and I realised how Bones work. So here is a simple tutorial to show you (and any other lost soul out there) how to get started with Bones.

It must be said that the procedure can be a bit complex and labour intensive, but there's no easy way to do Bones, so follow the tutorial closely and you shouldn't go wrong.

1 The first thing you need to do is open *Imagine's* Detail Editor. Then add a primitive tube with the following dimensions: Radius 20, Height 200, 24 circle sections and 4 vertical sections. Make the top and bottom ends closed. This will be our basic object to which we will add bones and then make them move.

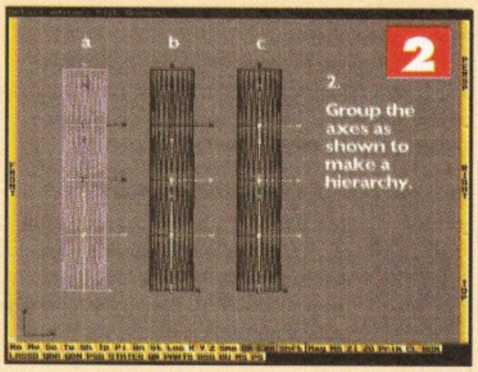
Next we must add a series of axes to represent the bones. In our example we need to add three axes altogether, one for each section of the tube. Think of the division between each section as a joint. Position each axis centrally in the tube (this should be at X=0, Y=0), with each one level with one of the three vertical section dividers. In the example the Z positions for the axes are 50, 100 and 150 respectively.

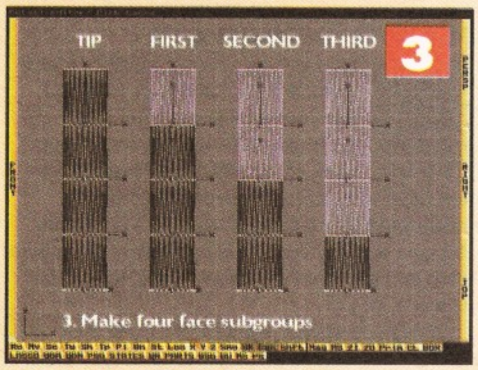
2 To make Bones work correctly we need to group them hierarchically to the parent axis of the tube object. Do this by holding down a Shift key, selecting the tube object, then the lowest Bone axis (Z=50), and group them together (Right Amiga g). The axis at Z=100 must then be grouped to the axis at Z=50, and the axis at Z=150 grouped to the Z=100 axis.

What you are essentially doing is mimicking a bone structure like the one in your arm. The parent axis represents the shoulder, to which the arm is attached. The other axes are like the elbow, wrist and first set of knuckles, each joined to the last and moving when its parent joint moves, as well as when the joint axis itself moves. By grouping the Bones like this you have made a hierarchical group.

3 We now need to make a series of face subgroups for the Bones to connect to and influence the movement of. This is probably the most awkward part of the whole Bones procedure to grasp, and the example in the *Imagine 3* manual doesn't explain this part at all well. What







you could buy an integrated accelerator, SCSI interface and memory card such as those produced by GVP for your A1500 instead and have most of the performance of an A4000, though you won't get the AGA graphics modes, of course. It all depends exactly what you want to do – and I'm afraid you've skipped those details here.

If I was in the market for an A4000 I'd go for a 4000/40, but I would first seriously consider whether or not to upgrade my A1500, especially if the savings could buy me that scanner or digitiser.

Speaking of scanners and digitisers, the thing to consider here is whether you need to capture images from paper or video. If you want to grab video you've no choice but to use a digitiser, but a colour scanner such as those produced by Epson will give far superior results if you are taking images off paper. You'll also need to purchase some software capable of driving the scanner, and an interface cable. If you want a good video digitiser make sure it can handle 24-bit graphics and is a fast-scan model (such as Macrosystem's VLab or Rombo's Vidi-Amiga 24RT) as these will give good results without the need for a perfect pause facility on the source VCR.

As for laser printers, that's not really my department, but I do know that they can be rather restrictive unless they have a reasonable amount of onboard memory. Again, what you get depends on what you need to do – how fast, to what resolution and at what price, and whether you want to do mainly graphics-based work or stick with mostly text-based publication, which in general requires less memory in the printer. ***Gary***

PC TO AMIGA FILE COPYING

I am a student using my college computers to access the Internet and have discovered huge amounts of Amiga PD and shareware programs. Since PCs are the only machines available to me I have no choice but to copy it to MS-DOS formatted disks.

How can I transfer the programs to Amiga formatted disks using my Workbench 1.3 based machine? Would it be as simple as using, say XCopy2, to copy Amiga disks?

Paul Egan ClonMell Co Tipperary, Ireland

You need to get yourself a PC Amiga file reading/writing utility and luckily a number of these utilities have been produced. *MessyDOS*, a shareware product written by Olaf Seibert, is very useful but Central Coast Software's *DOS-2-DOS* and Consultron's *CrossDOS* have been the two most popular commercial offerings. *CrossDOS* now comes as part of the Amiga's system software but with earlier machines, such as yours, *CrossDOS* had to be purchased as a separate utility.

All these utilities let the Amiga read from and write to PC, ie. MSDOS, disks and this allows you to directly transfer binary files, text files, graphics, spreadsheets and databases files and so on, between your Amiga and other machines. Your downloaded Amiga programs can therefore be stored on a PC disk, copied to your Amiga's ramdisk, and from there written to an Amiga disk just as easily as you would copy any other files.

If you have two disk drives it's even simpler – you can read PC data from a PC formatted disk in one drive and write to an Amiga formatted disk in the other! These utilities are extremely easy to use. For example, once a CrossDOS driver has been loaded you can copy, delete, move, rename files and so on using both Workbench icon/menu style operations or equivalent Shell style commands. Files can be saved to disk using either the driver name, eg PC0: (or perhaps DI0: on an older system), or the disk volume name. MSDOS disks can be formatted in the same way as Amiga disks and read directly by PC machines.

Incidentally, disks prepared on PC machines must be formatted to 720K, not 1.44 Mb or higher because *CrossDOS* will not read high-density formats on older Amigas.One thing that you do need to be careful of are the MSDOS filename conventions. As you probably know they are more restrictive that the equivalent AmigaDOS variety especially as far as filename length is concerned. MSDOS filenames can only consist of up to a maximum of eight characters plus an optional three character extension conventionally used to specify

...BONES IN IMAGINE 3

will happen is that two subgroups will be 'attached' to each bone, one subgroup which will move the furthest during the bone's manipulation and the other which will move the least. It's easier to show how to do it than describe how it works!

Think of the tube as a finger (admittedly with an extra joint). When the joint at the top of the finger moves the fingertip moves much further than the joint itself. The same holds true for each of the other joints. Bones simulates this hierarchical motion.

We need to make several face subgroups, so do the following: Select the tube object. Go into Pick Face mode (Right Amiga 5). Then select the Drag Box pick method (as opposed to Click), hold down a Shift key and drag a box out around the faces which make up the upper closed end of the tube. Now select Make Subgroup and call this subgroup TIP. Next select all the faces between (and including) the tip and first joint of the tube (working from the top down).

Use Make Subgroup again and call this subgroup FIRST. Then select everything from the tip to the second joint (where the Z=50 axis is). Call this one THIRD. You can actually use any names you like, of course, but maybe you should stick with these for now.

4 To get the Bones to work we have to attach the subgroups to them in a very specific order. Pick the uppermost axis (Z=150) and then select Bones Subgroup from the States menu. A requester will appear. In the upper text field type FIRST (don't forget to press Return after entering the name). In the lower text field enter TIP. This process sets the sphere of influence for the first bone. Click OK on the requester.

Move to the next Bone and enter SECOND in the upper field, FIRST in the lower one and click OK. For the third Bone down (Z=50) enter THIRD and SECOND respectively.

5 The next step is very important. Pick the tube object and then select States. Create a new State (call it DEFAULT) and make sure that Shape and Grouping are both selected.

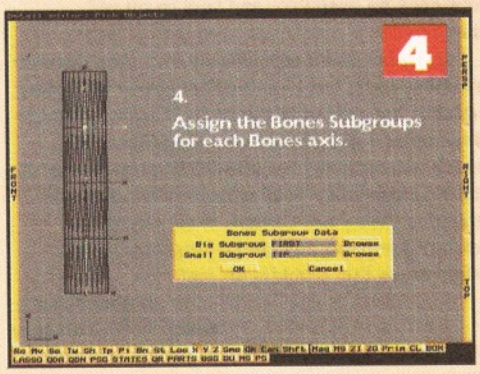
Click on OK. Save the grouped object (Right Amiga 1) as BonesTest.bon.

6 Now comes the fun bit. Remain in Pick Group mode (right Amiga 1) and select a bone (try the third one down) in the Front view. Rotate it a little (right Amiga r) around the Y axis. Rotate other Bones if you wish. Then select the parent object (the tube) and select Bones Update from the States menu. You should see your object snap to its new, deformed, position.

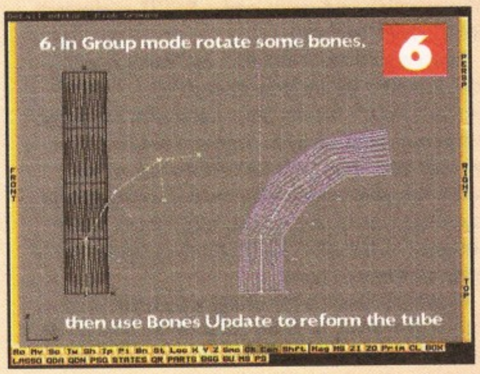
You could now create a new State for this position (call it FIRST, perhaps) and save the object again. Ensure that Shape and Grouping are selected when you make a new State. Test out your States with State Anim. When you come to set up an animation in the Action Editor just make sure that you set the correct object State for each part of the animation.

And that's the basic method for making Bones. Modify the basics by using more axes and divisions for a smoother look.

I hope I've helped you figure it all out now.
Gary







a file type.

CrossDOS converts filenames and directory names to upper case although, like the Amiga, file paths and names are not case sensitive. Test, testfile, and testfile.txt are therefore valid DOS filenames. MyOwnTestFile is not and if in fact you attempt to save a file with a long name to an MSDOS disk the filename will be truncated to the maximum of eleven (8+3) characters (which means in the above example the file will be saved as MYOWNTES.TFI). These types of truncation effects can occasionally cause problems if, for example, a batch of Amiga files are being transferred whose first eleven name characters are identical. In these cases it is necessary to rename the files before saving them using CrossDOS. *Paul*

IT'S A CODE GENERATION

CODING

I am writing to you in the hope that you can answer a few questions which I have.

1. I am developing a code generation utility. My aim is for this generated code to be in a format which can be incorporated into the executable file at linktime. Ideally, then, it would be either an object module, or a linkable library. Do linkable libraries exist on the Amiga, as they do on the PC, and if so, is there a utility available to create and maintain them?

Whether I use libraries or object modules, how do I pass parameters to and from my generated code? I would like my code to be generic so that it could be mixed with C code, assembly code, and so on. I know that SAS C uses stack based parameter passing and return values which are put into registers according to their type. Should I use this convention and assume that all languages (Apart from 68000 assembly language of course) will be compatible?

2. A friend and myself are planning to write a game, initially for the Amiga platform. My friend is a musician and has an Atari ST with various instruments connected to his MIDI port. He has given me a number of 8-bit mono samples in AVR format which I have been successful in playing on my Amiga. What we don't have, however, is any idea of how to play music. I am sure that the hardware does not have any pre-programmed instruments, but I can't believe that music has to be loaded in as a repeating sample. Surely even a small loop would take huge amounts of disk space?

3. Also, I would like to take this opportunity to state my total amazement that Commodore can ask Joe Public to buy their machines and take them seriously, and not supply the AmigaDOS and ARexx documentation. If Microsoft had attempted this there would have been a huge uproar. It is a credit to your magazine that you do a good job of covering Commodore's huge inadequacies.

Darren Clarke
Cowley, Oxford

1. If you are generating such a utility, by the sounds of it, you're writing a compiler. Generating object files is a complicated business, and you'll certainly need the AmigaDOS developer manual, 3rd edition, ISBN 0-553-35403-5, published by Bantam books. This book contains information on object file formats. SAS C will allow you to create linker libraries, documentation on this subject can be found in the SAS manuals. An alternative solution to your problem would be creation of shared libraries, which sit in the LIBS: drawer and are easily accessible to all languages.

This isn't a solution to every problem, but might be worth thinking about. If your problem really just requires creation of link time object files, then an idea might be for your code generation utility to actually create source code rather than object code, in 'C' for example. This could then be compiled by the compiler, which is likely to do a good job of it, and will (hopefully) have future support and development.

2. There are many music players out there available as PD or shareware for the Amiga. Most of them work using a system which was originally called "SoundTracker". This file format allowed the creation of music modules, which contained the sample data for each of the instruments which were used in the tune, and then divided the entire piece into individual patterns. The composer could

use these patterns to create sub-parts of the music, and then link them together in whatever order preferred, even re-using patterns for maximum efficiency. "ProTracker", or "OctaMed" (an eight voice version) are quite popular. The advantage of using these, is that you will be able get source code which plays modules to use as reference, which will save you time.

3. You and everyone else I'm afraid. Let's hope that the changes that are happening at the moment are positive, and that a future Amiga company think of these things. (And it's worth remembering that MicroSoft aren't angels, either!) ***Toby***

DESKTOP DYNAMITE

CODING

I have recently bought an A1200 desktop dynamite pack, and I am very pleased with it. Ever since the release of the 500+, I have been reading about that much acclaimed ARexx language, and now I have actually got it, I decided to look back at all my previous issues of *Amiga Shopper* and find the very first ARexx article. After reading exactly what ARexx is capable of, I decided to have a go myself. I loaded up workbench, and double clicked on RexxMast. I then opened a Shell, and used ED to create a program which just contained a PRINT statement (PRINT 'Hello There').

I saved it in the RAM disk as "trexx.rexx", and attempted to run it by typing "RX ram:trexx.rexx". ARexx responded with the error "Command returned 5/1: Program not found". I have also tried this with SAY 'Hello there' and exactly the same thing happened. I would like to know what I am doing wrong, why ARexx is not mentioned in the Workbench Manual, and what version of ARexx I have.

Finally, is there a PD utility which converts IFF to JPEG? Also, is there a PD utility which will create colour fonts, and convert between Agfa, Compugraphic, Adobe Type 1 and Amiga Bitmap fonts? If there isn't one, could you suggest a cheap alternative?

Jason Redway,
Basildon, Essex

Well, your ARexx problem is very easy to solve. *All* ARexx programs must start with a comment, otherwise ARexx will not run it. This is a form of "file confirmation", whereby ARexx can assume that anything that does start with a comment is indeed ARexx, and anything that does not, isn't. This means that ARexx won't run your startup-sequence, for example: it will just respond with "Command returned 5/1: Program not found". Try this:

```
/* This is my first ARexx program! */
SAY "Hello World"
EXIT
```

The EXIT statement is not strictly necessary, as ARexx stops when it reaches the end of the file, but it's good programming practice to include it, as when you add functions and procedures to more complex ARexx programs, you don't want to risk ARexx erroneously running things it shouldn't. Also note that there isn't a PRINT statement in ARexx, use SAY. If you get into ARexx, you might like to copy the RexxMast program into your WBStartup drawer, so that ARexx is automatically started for you every time you switch on your computer. You'll need to ensure it has a "DONOTWAIT" tooltype, however, which you do by clicking on its icon once and selecting "Information" from Workbench's "Icon" menu.

ARexx is not mentioned in the Workbench manual because it actually has its own separate manual, which is only included if you buy an A4000. Also, it's probably not much use for beginners anyway, because it's more of a language reference manual than anything else. If you want to learn ARexx, it's best to buy a specific book, such as the one by me which Future Publishing (the publishers of this mag) will be releasing soon (call Future Publishing on 0225 822 511 for details).

It's a pity that the Amiga does not come with a proper ARexx manual, as it's a great language for beginners and professionals alike, allowing you to make the most of the Amiga's multi-tasking operating system. You should have ARexx 1.15, which is the current release of the interpreter. William Hawes (the author of ARexx) may update the language in the future.

I'm afraid I'm unable to help you with the converters. The program we use at my office is *Art Department Professional*, but this is quite an expensive piece of software. Although this won't help you with the fonts problem, it will help you with the JPEG, IFF and any other picture format you can think of. It also allows you to scale pictures from one resolution to another, remap them to have less colours, and perform all sorts of wonderful alterations to pictures, and to top it all it has an ARexx port, so you can write ARexx programs to automate the long boring tasks. If you can't afford to buy it new, it might be worth trying to get it second hand. Check with a few PD suppliers with regards to the font conversion (and indeed the JPEG to IFF problem). ***Toby***

CONNECTION CONFUSION

VIDEO

I have an Amiga 2000HD with ColourPic digitiser and Rendale 8806 genlock. I had the digitiser before I got the genlock and I was previously digitising pictures quite happily but now I'm a bit confused about what to connect to where. I also have two Philips 723 VCRs which I use as source and recorder for my video work and I use both a Commodore 1084S and a TV as my monitors.

I'm now learning to title my videos and I have two questions which I hope you can answer.

1. Is it possible to digitise and title without connecting and disconnecting the video inputs and outputs to my digitiser and genlock?

2. Could you give me a connection diagram?

Miss Vinitha Nanayakkara
Nuneaton, Warwickshire

I have a couple of suggestions for you. The first is to get someone to build you a simple switch box (Illustration A) to which you can connect your video source and then switch it to either the genlock (for titling) or the ColorPic (for digitising). This would be set up for either S-Video or composite video, depending which signal output you normally take from your source VCR. By leaving the switch box's two outputs permanently connected to both the digitiser and the genlock's video inputs all you have to do is flick the switch and the video signal will be sent to the device you desire.

Note that you can only use one device at a time with this method. Don't try to divide the video signal between the genlock and the digitiser or it will start to degrade.

The second option is to loop the video signal through the ColorPic and then take it to the 8806. With this method you'll only be able to use composite video, since the ColorPic cannot pass S-video signals through. Take a look at the connection diagram shown (Illustration B) and see if this helps.
Gary

MACHINE CODE AT ANY COST

CODING

I have been trying to learn machine code for a while now, but I am having a few problems.

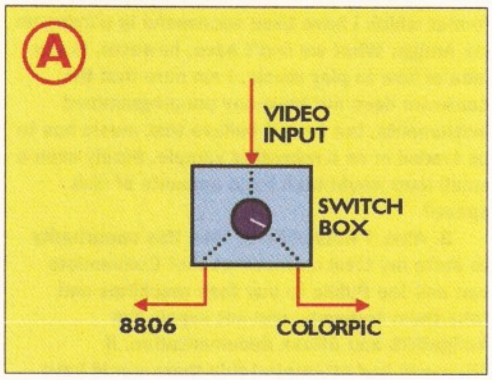
1. When will the A1200 specific RKMs and hardware reference be available, and how much will they cost?

2. I want to incorporate my own graphics into machine code, but I can't afford power windows, which is suggested in the book *Mastering Amiga Assembler*. I got a program called Make Data which converts any file into DC.W statements, but the graphics when used with DrawImage in the graphics library are corrupt. What might be wrong? Are there any cheap programs which might solve this problem for me?

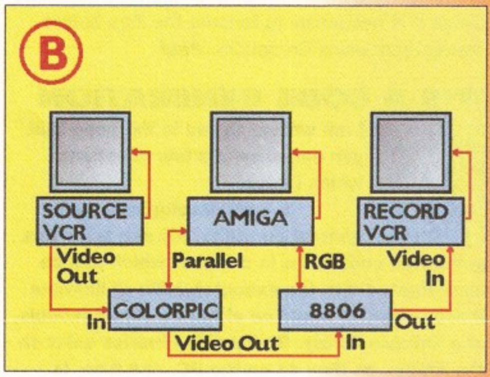
Anthony Taylor,
Selby, North Yorkshire

1. There are no specific A1200 RKMs, and sadly, there are unlikely to be any for some time. The current versions of the RKMs, however, are very up to date. These are edition 3 and cover Workbench 2. They are worth having, and are worth their weight in gold – particularly the Libraries Reference (about 30 pounds, ISBN 0-201-56774-1), although it does require at least a reading knowledge of C (which is no bad thing to obtain).

With regards to the features which were added in 3.0 and 3.1, your best bet by FAR is to get the Amiga Developers Kit, version 3.1. This is available from Commodore at the cost of £23, and comes complete with the very latest disk based reference for every library function, heaps of example code, utilities, debugging tools... essential for every



A couple of suggestions for Vinitha – build a simple switch box to which you can connect your video source and then switch it to either genlock (for titling) or ColorPic (for digitising).



The second option is to loop the video signal through the ColorPic and then take it to the 8806. With this method you'll only be able to use composite video.

developer. If you're interested, you can send a cheque for £23 made payable to "Commodore Business Machines (UK) Ltd." to:
Sharon McGuffie,
Commodore Business Machines (UK) Ltd.,
Commodore House,
The Switchback,
Gardner Road,
Maidenhead, Berks. SL6 7XA

Include a covering letter explaining that the cheque is for the "3.1 Amiga Developers Upgrade". If you're serious about Amiga development, you might also like to enquire about becoming a registered developer at the same time.

There is no hardware reference for the AGA chipset. This was to help avoid the compatibility problems when peoples software (particularly games) didn't work on newer Amigas. If you have a real need for access to this information, Commodore may be able to help.

2. You don't want to be using Power Windows. It's extremely dated, and won't help you with developing under Kickstart 2, or 3. It's most likely that the PD utility you have is working fine, but you have failed to put your graphics data in Chip RAM, or you are using the DrawImage function incorrectly. Any information which the Amiga is going to use directly with its hardware chips has to be in Chip RAM to work. This includes screen data, sprite data, audio data, and all sorts of other things. Try adding this line before the first DC.W statement:

```
section my_data,data_c
```

This will force the data to go into Chip RAM. Of course, if your A1200 is unexpanded, then all of your memory is Chip RAM, so this won't make any difference. Read the documentation on DrawImage very carefully, as you need to pass it the address of an Image structure, with information about the image data to make it work.

The Image structure looks a little like this for Assembly programmers:

```
MyImageStruct: dc.w  10 ; Left Edge
   dc.w  10 ; Top edge (Basically, pixel
position of top left corner)
   dc.w  64 ; Width of object
   dc.w  32 ; Height of object
   dc.w  2  ; Depth of object, number of
bitplanes.
   dc.l  my_image ; Pointer to our actual
graphics data.

   section  sprite_data,data_c

my_image:   dc.w  10,10,10.... etc etc...
```

Also DrawImage is in "intuition.library" *not* "graphics.library", which might also explain your problems. ***Toby***

EXTRACTION OF IFF COLOUR INFO

I am a lecturer at West Herts College reading for a PhD in image processing with the University of Hertfordshire. Essentially I am transforming RGB colour space values to the CIE domain and then performing shifts on the chromaticity co-ordinates. These shifted co-ordinates, when converted back to RGB values, give an image that displays the colour changes originally requested by the user.

I have spent a considerable time studying the layout of the IFF file format but am having difficulty in finding a successful method for the extraction of RGB data. I need to carry out the following steps: analyse the IFF file and extract the RGB data. Modify the RGB data with a filter algorithm. Create a new IFF file showing the effect of the filter algorithm. I've written programs for the colour space transformation but am having difficulty with the IFF file programming (this is possibly because I'm not an experienced programmer and have only studied topics relevant to my research). Any ideas would be welcome!

A J Cook
Loughton, Essex

Proper IFF file handling is not particularly easy but presumably you have the RKM manuals (the 'Devices' volume contains a lot of IFF file material) and other Commodore related public IFF file structure notes for reference. Since Release 2 there has of course been an IFFParse library available to help simplify the job of parsing IFF files and this library is documented in the RKM 'Libraries' volume.

Obviously from an aesthetic viewpoint it would be nice for you to get stuck into the IFF coding issues and come to terms with the parsing strategies etc. Unfortunately this could take time and since the IFF issues themselves are not a fundamental part of your current research I am going to suggest, as a temporary measure, that you take an easier way out. As you'll know the Amiga's colour indirection scheme means that bitplane pixel information does not need to be changed during colour transformations. All physical colour information is stored in an IFF chunk called a colour map (CMAP) chunk and since the only changes you'll be making are to the colour values inside these chunks there are no IFF chunk rearrangements or chunk/file size changes to contend with.

> **"It's worth remembering that MicroSoft aren't angels either."**

You could therefore code some simple, dirty, CMAP chunk data extraction and replacement routines without worrying about the formal IFF file structure at all. In other words, forget about proper IFF parsing strategies and sequentially read straight through the file until you get to the information you want. To do this you just need to open the IFF file and read through it byte by byte basis until you get to a "CMAP" chunk identifier. Immediately following this you'll find the long word "size of the chunk" which will tell you the byte size of the colour data that follows. The N colour map entries are stored in order 0 to (N-1) totalling 3N bytes so if you divide the chunksize by 3 you can work out how many table entries are present.

After reading the chunksize the file stream pointer will be at the start of the first colour map entry so do a Seek() at this point to record this position (for later re-writing) and then read and store subsequent colour map entries into an array for your processing (you can keep the file open). Do your colour value transformations, perform a Seek() to get back to the colour map start that you recorded earlier, and then simply re-write the modified entries from that point (overwriting the existing colour map data). Routines like this will do the job you want perfectly well and, most importantly, they'll allow you to test your main algorithms much sooner than you would otherwise have been able to do! ***Paul***

MORPH-LESS

I have a new A4000 and I've just started using Morph Plus. All I want to do is to still morph the owl pic into the baby pic. My problem is that when I go to project options I don't know what to put as the "Output Image Base Name". Can you tell me exactly what this means?

Yashir Mamodeally
Harlow, Essex

This is one of Morph Plus's little quirks. But all it means is that you have to enter a base name for the pictures that Morph Plus will save when it renders the project. For instance, if you want the morph to take place over 10 frames and you give a base name of YASHIR then each newly-generated image would have a name like YASHIR.00001, YASHIR.00002 etc. And that's about all there is to it. OK? ***Gary***

TAXAN TROUBLE?

When I connect the RGB output from my Rendale 8802 genlock to my Taxan 770 multisync monitor the screen image becomes corrupted. Could you advise me on a replacement genlock which will work with my Amiga 3000 and still give good pictures on my Taxan monitor? The new genlock can be either internal or external up to a budget of £600. I also require that it has S-VHS and composite inputs audio in and out and, preferably, some sort of fading functions.

A. J. Leach
Eaton Ford, Cambs

I checked with Taxan and, since the monitor can sync down to 15KHz horizontally, your 770 should be able to handle a video signal with no problems, so I'd guess that your troubles aren't necessarily caused by the genlock. It may be that the way your VGA RGB cable is wired up isn't suitable for this genlocking application. My suggestion would be that you try to get hold of (or make, if you know the pin connections for your Taxan 770 and the Amiga) a new lead which will allow you to connect directly from the Rendale's RGB output to the monitor's input. Take careful note of the sync inputs required by the monitor and make sure these are properly connected.

Investigate this solution before contemplating a new genlock, because I think that you'll find that any genlock you connect may well exhibit the same problems if your lead isn't up to scratch. Just out of interest, what does the genlock's video output look like when you record it to tape or view it on a dedicated video monitor? Perhaps you actually have a problem with your genlock giving out a dicky signal? ***Gary***

VIRUS CHECKER PROBLEM

I have always had virus checkers up and running on my machine but when I upgraded to Virus Checker 6.25 my A600 started crashing. I've gone back to an earlier version (6.20) and the machine then works perfectly with both the virus checker and all my other software. Can you throw any light on the crash problem with the later version of Virus Checker?

T. Stewart
Newquay, Cornwall

I also use Virus Checker but since I do not update it particularly regularly I have missed some of the recent versions that have arrived. I know however that versions between 6.25 – 6.33 (and perhaps

some later ones) have produced problems and have failed to work properly with all Amigas.

Since your machine works fine in all other respects you have little to worry about – the Virus Checker bugs that cause the crashing have doubtless been fixed in (or will soon be) in latter releases. Just continue to use your current version until a new one arrives that does run on your machine! ***Paul***

WHY DO I NEED A HARD DISK

I have an A500 with a 1/2 Meg upgrade. Why do I need a hard disk? What happens when it is full and how much can I get for my trusty old friend when I purchase another model?

A. Dalli
London

For all I know you may not need a hard disk – perhaps you only ever play games that can't be installed on a hard disk anyway! In general, however, hard disks are faster to boot from, faster to load programs from and faster for reading and writing data. You can have all of your favourite, ie most often used, programs installed on your disk so that they can be run at the click of a mouse without a floppy in sight.

Most importantly, by having Workbench installed on your hard disk, all those annoying 'Please Insert Workbench XXX' type requesters that plague floppy based users disappear because all the Workbench utilities and commands are then there instantly ready for use at all times. There are other advantages as well including a slightly wider choice of software since some of the larger packages available for the Amiga (like SAS C/C++) are no longer usable from floppy-only based Amigas.

If you are a large data file user (massive spreadsheets, databases etc) then a hard disk allows you to create much larger data files (far larger than a complete floppy disk). In short, a hard disk is a bit like a telephone or a car – once you've had one... you'll wonder how you ever got by without it! If you do run out of space on a hard disk you've had it – you'll have to delete some existing files before you can save anything else – that's why it is important to get a drive with a capacity that is large enough to hold everything you'll ever need (plus a bit more for luck). The established 'rule of thumb' is to work out how much space you need – and then double it!

To get an idea of second hand Amiga prices you ought to check out the reader ads on pages 40–41 of this brilliant magazine, or try our sister mag *Amiga Format*. ***Paul***

HARD DISK PROBLEMS

Last Christmas I brought a hard disk but when it was about half full I started to get 'Write error on Block XXXX messages' and these cause problems when I try to do a fully-fledged conventional backup. Could the disk have been badly prepared in the first place?

Vladimiro Florival Maceodo
Pacos De Ferreira, Portugal

It's certainly possible so you need to back up your data files even if you have to do it file by file using the copy command. Don't bother backing up your programs or your Workbench files because these can be re-installed from your original master disks (which presumably you have). Having done that first thing to try a high-level format of each partition. If that fails you will need to re-prepare the disk (ie do a low level format), and then repartition your drive. Whatever you do DON'T carry on just using the disk whilst write error messages are appearing! ***Paul***

AMIGATEX

I'm taking a degree at university and need some good software for handling complicated mathematical formulae. After a little research on PD libraries I've come across TeX, Matlab, Multiplot and so on, but the TeX distribution does not include any previewer or printer driver. I've heard of two commercial versions AmigaTeX by Tomas Rokicki (Radical Eye Software) and PasTeX/NiceTeX by George Hessmann (Germany). Can you tell me which is the better choice?

> ***"I need some good software for handling complicated mathematical formulae... Can you tell me which is the better choice?"***

Mario Fiadeiro
Lisbon, Portugal

All of the TeX Amiga users I know have opted for Tomas Rokicki's AmigaTeX offering and I think that fact speaks for itself! ***Paul***

SAVE AND SAVE AS

I am very new to the Amiga and although using a number of word-processors am confused between the SAVE and SAVE AS options. When I save files they go on the program disk which is quickly filled up because there isn't much space spare. When I try to save to a blank disk my programs tend to ask for the program's own disk to be inserted.

P. Busancano
Clapham Park, London

As a general rule you shouldn't save your data files to the disks the programs are on. It's bad practice for two reasons: firstly, some programs have copy protection schemes that can actually cause a program on a disk to stop working if the disk's file contents are changed. Secondly, because saving files on a program disk means that you have to keep that disk 'writeable' it also means that the disk could become infected with a virus.

You really ought to write protect your program disks by sliding the write protect notch over to the side where you can see through the hole (although you will find the odd game program etc., that requires the program disk to be kept as writeable)!

With that lecture over, your SAVE and SAVE AS problems are easy to explain. The first time you save a file you should use SAVE AS because this allows you to give the file a name chosen by you. Even if your word-processor programs bring up a system requester asking for the program disk to be inserted initially you can usually either just cancel that requester or, once the real file requester appears and the drive light goes out, just swap to your blank disk and click on df0 (or whatever drive you have your blank disk in) to 'log in' (ie. read the root directory of) that new disk.

At this point the file requester will show you the drive and directory that your file will currently be stored in but you can change these items using the file requester gadgets at any point up to where you click on the file requester's OK (or similar) box. You normally only use SAVE to update an existing file that you have re-opened for further editing! ***Paul***

A500 UPGRADE

I've got a lot of PD software (mostly serious programs) and would like to replace my A500 with either a 40Mb A600 HD or an A1200 adding a hard disk to this latter machine when funds allow. Which do you recommend and do you think that it is likely that Commodore will do an "A500+" on A1200 users, ie upgrade the CPU to a 68030 and call it an A1200+? Also could you suggest a suitable programming language for beginners?

Gerard Mulvey
Wesley Castle, Birmingham

I don't like the A600 full stop and if you have a lot of serious software then, to my mind, an A600 with just a 40Mb hard drive is likely to become a timebomb waiting to disappoint you. Go for the A1200 – it is a much better machine but when you do get a hard disk get the highest capacity drive you can afford 100 – 200 megs, or more, if funds allow. Remember Workbench 3 alone takes up about 5Mb of space!

Who knows what Commodore will be doing upgrade wise. The only thing that is certain is that the upgrade policies of the new management team can't possibly be any worse than the old crew! A language for beginners? Go for one of the Basic flavoured languages such as HiSoft Basic, AMOS, or Blitz Basic! ***Paul***

SYSTEM EXCLUSIVE

Could you please tell me how I can save system exclusive data via Midi from my Ensoniq SQ-1 to my A1200. I have a CLI utility from a PD disk but the sparse instructions failed to reveal its usage to me. Could I write a program using Basic or AMOS to do it.

John Gore
Argyll, Scotland

I tend to use my sequencer/librarian programs for doing this sort of stuff so I don't keep up to date with the best (or the worst) of the public domain offerings currently floating around (for details of how to write this sort of program in AMOS, see page 71). I do know however that there are absolutely loads of PD utilities for doing this sort of thing. Search around and don't be put off by the one utility you've found that had poor instructions.

The SeaSoft Computing library is a good place to start because they seem to provide more music related offerings than most other libraries. In addition they also distribute the AM/FM disk based music magazine along with a number of other AM/FM disks that contain various Midi utilities. In general the disk magazines cost £2.50 per disk and normal PD/shareware utility disks £1.50 (an extra £0.50 for postage and packing needs to be tagged on to each order). SeaSoft Computing can be reached on ☎ 0903-850378.

Providing you are happy with the technicalities of Midi (ie. know what the various bytes mean) it can be quite instructive to write your own Midi software – even if you only use it for experimental purposes. It's perfectly feasibly to use Basic for

this and in the main the code is much the same as for collecting any other type of Midi data (Sysex collection can be a little harder to get working if very large messages are involved). Midi serial port access can be achieved using the Amiga's SER: device (which means that the complexities of accessing the underlying Amiga serial port are transparent).

All the programmer has to remember is that Preferences needs to be used to set suitable serial port characteristics, namely... a baud rate of 31250 with no parity, no handshaking, and just one stop bit. The file handling approach of most Basics is straightforward and the sequential file handling input/output conventions are that you 'output TO a file' or 'input FROM a file.'Midi data arrives at the Amiga serial port as a series of byte (8 bit) values and on the face of it a program simply has to read a byte as it arrives, use it, and then loop back to collect another byte ad infinitum.

In practice this approach turns out to be a bit too simplistic because it disregards the fact that any given Midi byte is likely to be related to either preceding and/or succeeding bytes. In short any Midi program which is going to do anything useful with the incoming data must be able to both recognise and distinguish between all of the various classes of Midi information.

How you do this depends on what you your program is going to do but this can mean recognising status and data bytes, being able to cope with real-time messages, and possibly even running status (implied status bytes) as well. For example, to collect serial data using HiSoft Basic on the Amiga a sequential file for 'input' can be used like this...

```
OPEN "SER:" FOR INPUT AS #1
```

Data collection is then carried out by reading bytes one at a time using Basic's INPUT$() statement, For example... x$=INPUT$(1,1). Normally it is more convenient to collect the value as a number rather than in string form and to do this you can use the ASC() function like this...

```
x=ASC(INPUT$(1,1)).
```

Using this collection statement in conjunction with a loop arrangement allows us to collect as much data as we want. To collect one hundred Midi bytes we might use something along the lines of...

```
FOR i = 1 to 100
x=ASC(INPUT$(1,1))
do something with the value in x
NEXT i
```

A simple loop which could be used to continuously collect Midi data would look like this...

```
forever=1
WHILE forever
x=ASC(INPUT$(1,1))
do something with the value in x
WEND
```

Paul

SPECTRUM GAMES

I've changed from a Spectrum and have a large number of games. Can I use an emulator to play them using the Amiga and, if so, which emulator would you recommend. Also, how do I get the programs on to disk?

T Yarnall
Beccles, Suffolk

There are a number of Spectrum emulators around but one called ZXSpectrum by Peter McGavin is quite well thought of. It includes a settings menu that allows you to load a Spectrum game from tape using a sound sampler and store it on disk as a 'snapshot' file. Prosound and Rombo samplers are directly supported but most units that can sample at rates of at least 20KHz will also work.

Paul AS

FILL IN AND GET US TO ANSWER YOUR QUESTIONS

If you send in a question for the Amiga Answers experts, please fill in and include the form below (or a photocopy if you don't want to cut up your magazine). And please, also make sure that you include all the relevant details – version numbers of software and so on – so that we have the best chance of helping you. **If you have *several* questions in different fields that should be addressed to more than one of our experts, please send in your queries on *separate* forms.**

Send your form and question to: Amiga Answers, *Amiga Shopper*, 30 Monmouth Street, Bath, Avon BA1 2BW.

Name: ______________________

Address: ______________________

Your machine:

A500 ❑ **A500 Plus** ❑ **A600** ❑ **A1000** ❑ **A1200** ❑

A1500 ❑ **A2000** ❑ **A3000** ❑ **A4000** ❑

Approximate age of machine: ________

Kickstart version (displayed at the "insert Workbench" prompt)

1.2 ❑ **1.3** ❑ **2.x** ❑ **3.x** ❑

Workbench revision (written on the Workbench disk)

1.2 ❑ **1.3** ❑ **1.3.2** ❑ **2.04/2.05** ❑ **2.1** ❑ **3.0** ❑

PCB revision (if known). Do not take your machine apart just to look for this! ________

Total memory fitted (see AVAIL in Shell for Workbench 1.3) ________

Chip memory available (see AVAIL in Shell) ________

Agnus chip (if known) ________

Extra drive #1 (3.5in/5.25in) as DF__: Manufacturer ________

Extra drive #2 (3.5in/5.25in) as DF__: Manufacturer ________

Hard disk: ____Mb as DH__: Manufacturer ________

Extra RAM fitted – type, size in Mb and manufacturer ________

Details of any other hardware which could help us to answer your question: ________

Now, use this space to describe your problem, including as much relevant information as possible. Please continue on a separate sheet if necessary. ________

AS 42

Community CHESS

Cliff Ramshaw shows you how to write your very own chess-playing program.

Over the next few months I'm going to show you to write your own chess program – one that will enable you to play chess against your Amiga. Make no mistake – its game style wouldn't give Gary Kasparov too much trouble, but it will serve as a good introduction to the complex world of chess programming, as well as highlighting many important programming techniques that you'll find useful when writing all manner of applications.

Don't worry, you don't have to be any sort of expert to follow this series. So long as you've got the basics of programming under your belt – and you know how to play chess – you'll be able to follow what's going on. I'll also be including full listings, in AMOS and C, throughout, so even if you don't understand absolutely everything, you'll still end up with a fully working program.

Although it may seem like a relatively complex game, chess has much in common, at least as far as programming is concerned, with games such as noughts and crosses, draughts and Connect Four. The main difference is in the number of categories of pieces on a chess board (six in chess against one in draughts et al), and the more complex moves open to these pieces. Having followed this series, though, you'll find that the most significant part of the program is not the accounting for these differing pieces and their movements – true, it's not as trivial as it would be for, say, noughts and crosses – but the algorithm that chooses which move to make from those available. In fact, much of what follows is directly applicable to all of these games – by the end of the series you should be able to write programs for all of them.

Aside from the meat, if you like, of the chess program that makes moves, there are plenty of other parts needed to make it a working whole.

In common with just about every program that's ever coursed through a CPU's veins, this one is a question of three stages: input of data, processing of data, output of data. The input is the player's move, the processing is the analysis of the move and a replying move, and the output is the display of the new board (in which case there'll be an intermediate output stage, when the board is displayed after the player's move is input and before the real processing begins) or, more curtly, just a text message déscribing the computer's response. Because it's a game rather than a 'once-through' program (such as the AmigaDOS dir command, for example), these three stages repeat until the game is finished.

Initially, the input and output stages will be crude. The interest here lies in the processing part. We'll display the board with simple ASCII graphics – just so you don't have to dash out and buy a chess set – and label squares on it with a simple grid system of letter and number combinations, so, for example A1 will refer to the square at the top left of the board. This immediately suggests a way of dealing with the input: the program can ask the player for two coordinate pairs. The first is the coordinates of the square that contains the piece to be moved; the second the square that it is to move to.

ERROR CHECKING

It's always a good idea to put in some error checking: there's no sense in giving users as well as your own coding mistakes the chance to crash a program. Obvious checks include ensuring that the coordinates entered refer to positions on the board, that the first coordinate pair refers to a piece owned by the player, and that the second refers to either an unoccupied square or one with an opponent's piece on it – in other words, one that doesn't contain one of the player's pieces. These checks are all very easy to program, but the more sophisticated one of checking that the move requested for a piece is a legal one (preventing a pawn from being moved across the board as a bishop would be) seems to present more of a problem. Do we really have to examine the piece to be moved and write all the code necessary to determine whether the proposed destination square is within its legal reach? In reality, it's not that difficult because we can re-use part of the code that deals with making and checking the computer's moves, which we'll go into later.

Reusable procedures such as this one constitute one of the keys to good programming. A sufficiently generalised procedure can often be ported wholesale and re-used in a different program altogether (though not in this case) as well as being used, in subtly different ways, by several parts of the program that hosts it. For one thing, re-using procedures saves memory – it's much more efficient to write the code to perform a task once than re-write it into every part of the program that needs to perform that task – but it also reduces the chance of bugs. A re-usable procedure may be bugged, but if instead the code that carries out that procedure's task is written out explicitly several times in a program, any one of these instances may contain bugs. Most importantly, reusable procedures save re-inventing the wheel. Imagine the inconvenience of having to write code to open a window – including drawing each line, printing the title, handling the re-size and other gadgets – each time you wanted one, instead of just calling the operating system's nicely generalised procedure.

INPUT AND OUTPUT

The use of any kind of procedure (or function – a procedure that can be used as an expression, returning a value to the calling program) is a good thing. Procedures help to break a program down into chunks. It's much easier to picture complex programs in this way:

First think of your program in terms of input, processing and output, as we've done here. Each of these stages can, and needs to be, broken down

JARGON BUSTER

AMOS – Europress Software's version of the Basic programming language, tailored to take advantages of the Amiga's special features.
Array – a means of grouping a number of variables together under the same name. An individual variable, called an 'element', is accessed by means of the array name and its unique number, or 'index'.
C – a compiled programming language. It combines high-level features such as procedures, functions and many looping constructs, with the facilities to access memory at a low level.
Function – a procedure that returns a value to the part of the program that called it. The value can then be used to form an expression as any value would.
Procedure – segment of program, separated from the whole, that carries out a specific task.
Recursion – the process of a procedure or function calling itself, usually repeatedly.
String – a variable that can hold a collection of ASCII characters. These usually represent a text message, but it's possible to store any one of the 255 ASCII values, some of them non-printable, as part of a string. In C, a string is actually an array of character variables.



If you can't wait for next month, then you should see about getting hold of the excellent PD chess program UChess, which includes source code.

further. For instance, the input stage consists of getting two pairs of coordinates and checking the validity of the move specified, while the output stage consists of printing in turn the contents of each square on to the screen along with a pair of labelled axes. These sub-stages readily lend themselves to conversion into procedures. Once you've ensured that your collection of procedures will work together to provide the correct overall behaviour, you can then busy yourself with the details of each procedure in turn – in other words, the writing of the individual program instructions, which are the smallest sub-stages available. When you're writing one procedure, you need have no concern about the others, except insofar as they interface with the current one, and can concentrate on the job at hand. With a program that lacks procedures, one that consists of one long string of instructions, you have to keep the whole picture in your head at all times, you have to be aware how each instruction you write interacts with the rest. The former approach is called 'top-down', because you work from the overall concept at the top down to the nitty-gritty details at the bottom. The latter approach is called 'asking for trouble'.

DATA STRUCTURES

That's the input and output stages dealt with, so now it's time to discuss the main processing stage, right? Well, not quite.

Before we go any further, we need to talk about data structures. How you arrange the data within your program will have a profound effect on how the program itself will need to be structured. I say 'will need to be', because it's very much a future-tense affair – you should definitely have a clear idea of your main data structures before you start thinking about tapping away at that keyboard. This is another one of the keys to good programming.

The main data structure for the chess program is the board: the player's and computer's moves affect it; the computer uses its current to state to choose its move.

At the risk of being obvious, I'll mention that the board is an eight-by-eight grid of squares. It's natural then, to represent it by a two-dimensional array, with each dimension having eight elements. An array, you'll remember is a number of variables all grouped together under the same name. Each individual variable, called an 'element', is accessed by means of a unique index, a number that follows the array name in brackets. Elements in a two-dimensional array are accessed by means of two indices. You can think of them as coordinates on a piece of graph paper, with each square containing a value and being referenced by its x and y positions. As you can see, two-dimensional arrays are ideal for representing game boards, among many other things.

The next question to arise is: what kind of things do we need to store in the array elements? The array is essentially an artificial model of a real chess board – to use an already-cliched term, it's a virtual reality – so by looking at what the squares on a real chess board can hold we can decide what the array elements need to hold.

A square can either be empty or contain one of six kinds of piece. These pieces can belong to either player, so there are in fact twelve different piece types. Add on the empty square possibility, and we get the result that each square can be in any one of thirteen states. There are several ways these states could be coded into an array element, but the most straightforward is by using a numerical code. We'll use the number 0 to represent an empty square, 1 to represent a white pawn, 2 a white rook, and so on. Black pieces will be represented by negative numbers: -1 for a black pawn, -2 for a black rook, etc.. The advantage in using negative numbers for black pieces will be made clear later. The whole code is as follows:

-6	**black king**	**1**	**white pawn**
-5	**black queen**	**2**	**white rook**
-4	**black bishop**	**3**	**white knight**
-3	**black knight**	**4**	**white bishop**
-2	**black rook**	**5**	**white queen**
-1	**black pawn**	**6**	**white king**
	0	**empty square**	

Given that each element in the array needs to store one of these numbers, we'll make the array an array of integers (whole, or non-fractional, numbers). With just this, which stores the contents of every square on the board, we can represent the entire state of play at any time.

PIECE PROPERTIES

That's all very well, but much more is needed before the computer can play a game of chess on this artificial board. For a start, the properties of the pieces need to be defined. The most significant of properties for a piece is the ways in which it can move. These possible movements for each piece could be expressed in a set of data structures. The fact is, though, chess has so many special cases (pawns being able to travel two squares on their initial move and knights jumping over other pieces, for example) that I've chosen instead to explicitly state the rules for movement with programming code, embedded in the move-making section.

There are other piece properties to consider, though. Each piece will have an associated value with it (not to be confused with the number representing the piece itself) which corresponds to how important it is to the game – more on this when we go on to talk about how the computer makes its moves. And, to aid the program's usability, we'll store the name of each piece. With the aid of this, the program can print out messages like 'pawn from A2 to A4' when a move is made.

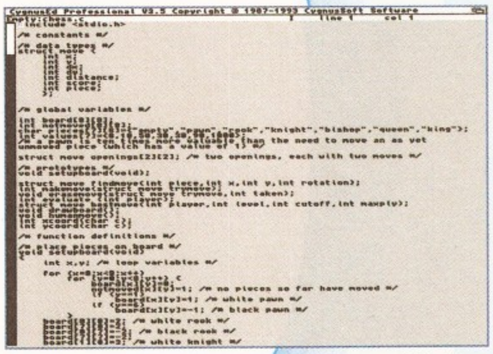
As you may have guessed, the piece names can be stored in an array, this time an array of strings (a string is a group of characters 'strung' together into a single variable, often used to hold text messages). As well as the names of the pieces, we'll also store the word 'empty', so that means we need an array of 13 strings.

Actually, we only need seven, as follows:element

0 "empty"element
1 "pawn"element
2 "rook"element
3 "knight"element
4 "bishop"element
5 "queen"element
6 "king"

(Notice how the element numbering beings from 0, not 1, as is the convention in C.) Our not needing to store the other six names is one of the bonuses of using negative numbers to represent black's pieces. The pieces' names, as are their above-mentioned values, are accessed using what's known as 'indirection'.

Imagine that you want to print out the name of the piece standing on a particular square. Given the array indices that correspond to that square's coordinates, you can find out the kind of piece that's present by looking at the value in that element of the board array. It will be a number between -6 and 6. Let's assume for the moment it's a positive number, which is to say it represents



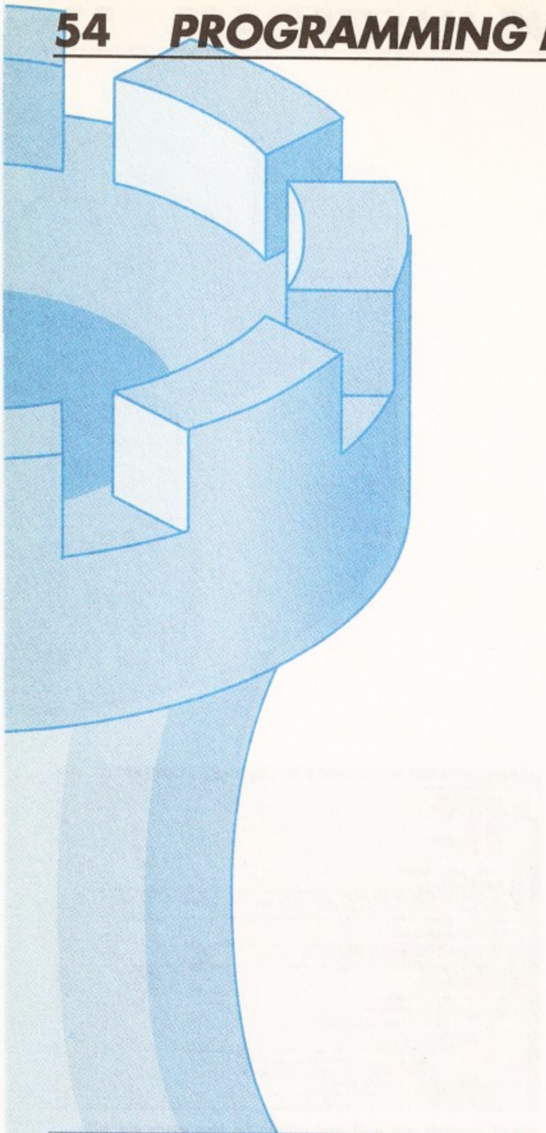
Next month we will get down to the gory details, with listings for our chess program in both AMOS and the popular C language.

A QUESTION OF LANGUAGE

I've chosen to present this program in two languages: AMOS and C.

AMOS is arguably the most popular Basic variant available for the Amiga, and isn't half bad. It's certainly capable of much more than noisy, flashy games. C, of course, is a professional-level language, the choice of most serious Amiga programmers. If you're more comfortable with another language, you shouldn't have too many problems translating either the AMOS or C code into it. Also, cross-referencing the pairs of listings should help devotees of the one language gain an understanding of the other.

One thing you will notice is that the AMOS code is clumsier in places than its C counterpart (although more readable, thanks to its keywords being closer to English). This clumsiness arises because C is, to put it simply, a more subtle language. It's biggest advantage here is that it can group related variables together into structures. Being able to handle structures is a real boon, not least because in C structures can be returned as values from functions, whereas AMOS can only return simple values. If you're an AMOS fan, I hope this series will encourage you to consider a graduation to C.



a white piece.

You can get the name of that piece directly by using the number as an index into the string array that holds all the names. If it's a negative number, all you have to do is first multiply it by -1 to make it positive before using it as an index into the name array as before. So the board array values of -1 and 1 both correspond to the string array element containing "pawn", while -2 and 2 correspond to the element containing "rook". That's all there is to indirection: the value in one variable – in this case an array element – is used as an index to access one of a selection of values from elsewhere – in this case one of the elements of a string array.

THE TRICKY BIT

So far we've discussed just about everything but the really important bit – the bit that decides which move the computer should make. This, as you might imagine, is where things get a little more tricky. Don't worry, though, you don't by any means need be a genius to understand.

So what's involved in the computer making a move? There are two major steps: discovering which moves are available for the board position in question, and then deciding which of these moves is the best. These steps are usually called 'move generation' and 'move evaluation'.

Move generation is straightforward, if a little long-winded. At any stage in the game, the computer has a choice of pieces to move, and also a choice of directions in which the chosen piece can move. The first part is accomplished by searching through each element of the board array in turn, stopping whenever one that contains a computer-owned piece is encountered. Empty squares or those inhabited by the opponent's pieces are ignored.

Once a piece has been found, each of the legal moves open to it must also be found. In our program, this will be carried out by a separate procedure. The procedure will be passed the type of piece it's dealing with, the piece's coordinates and the direction to check. The type of piece is given by the number in the element of the board array under question, the coordinates by the element's indices. There are eight possible directions of movement in chess (forwards, forwards-right, right, backwards-right, backwards, backwards-left, left and forwards-left) so the direction can be represented by an integer in the range 0 to 7. The procedure, or function, returns, among other things, the number of squares that the piece can traverse in the specified direction.

So, our move generating code can find each of the computer's pieces in turn and, with the aid of a couple of loops, determine each of its possible new locations in each of the permitted directions. Remember that a queen, for instance, can move anything between one and seven squares in any one of eight directions. That's a lot of moves for just the one piece, never mind the rest on the board. At the start of the game, the computer can move any one of its eight pawns either one or two squares forwards, or it can move either of its knights in one of two directions. That's a total of 20 possible moves to be considered.

This consideration, cogitation and deliberation is carried out by the move evaluator. Each move is given a value, and the move with the greatest value is the one that the computer chooses to make.

AIM TO WIN

How are these values arrived at? The computer is aiming to win, so the move that puts it into the position most likely to give it victory ought to have the highest score. I'll begin with a simple but effective algorithm for evaluating board positions, adding frills to give the game-play subtlety in a future installment.

The simplest assumption that you could base the evaluation process on is that the player with the most pieces on the board is 'in the lead'. Chess aficionados will throw up their hands in horror on reading this, and rightly so, but it can be refined into a workable stratagem.

The trick is to assign different values, also known as 'weightings', to each of the pieces. For instance, a pawn might be valued at 1, while a bishop has a value of 3. Playing like this, the computer would prefer taking one bishop to taking two pawns; equally, it would be prepared to sacrifice two of its own pawns in the taking of an opponent's bishop. The weightings I've used here are as follows:

empty	**0**	**pawn**	**10**
rook	**50**	**knight**	**30**
bishop	**30**	**queen**	**90**
king	**1000**		

I've used weightings in units of 10 rather than 1 – the significance of this will be revealed when we come on to discuss some of those evaluation refinements mentioned earlier.

Now, evaluating a board position becomes a simple matter. A score is kept, initially zero. Then each element of the board array is searched in turn. Every time a piece belonging to the computer is encountered, the score is increased by that piece's value or weighting. Every time an opponent's piece is encountered, the score is decreased by a corresponding amount. A positive score means that the computer is in the lead; a negative one that the opponent is winning. The initial board position, and all those that follow until a piece is taken, will have a score of zero.

The king is rated very much higher than all the other pieces, significantly higher, in fact, than the total value of all the other pieces on the board. Chess is about capturing the enemy's king and protecting one's own, not about taking pieces. Giving the king such a high weighting ensures that these will always be the computer's top priorities.

If you were to write a program around the algorithm outlined above, you'd end up with a very primitive one. For a start, the computer's opening moves would be random. The only intelligence it would exhibit would be when it took a piece offered to it, and then it would be unable to see beyond the immediate consequences.

The program needs to be able to 'look ahead' in some way – to see what the consequences of each move will be, to guess what the opponent's response will be, to come up with a response to that, to guess a further response from the opponent, and so on. The further ahead the computer can look, the better. If it could look ahead to the end of the game, perceiving the ultimate outcome of every conceivable move – then it would always win. Thankfully, the sheer variety of possible chess games is so huge that doing this just isn't possible. Instead, you have to compromise on the number of moves you look ahead against speed.

I'll talk more about how this is achieved, including an examination of how the computer guesses what its opponent's response will be, next month. We'll also be getting stuck into writing some of the code, which will be accompanied by detailed descriptions of what, why and how it does what it does. See you then. AS

CHOICES, CHOICES...

Remember that I said the choice of data structures determines the structure of the code? Well, the choice of using an array immediately suggests the necessity for a procedure. Array elements are accessed by integer numbers, while what we're receiving from the player as input is a coordinate pair, represented as an ASCII string. (We need to use this method because the square is represented by both a letter and a number.) It follows, then, that we'll be needing a procedure to convert the player's input into array indices. This, as you'll see, is very straightforward.

A couple of other things arise from the choices made so far. These all have to do with the 'initialisation' part of the program – the part that's executed before the whole thing gets properly under way.

For one thing, the board array needs to be initialised. This consists of putting the necessary values into each of the elements. The majority of elements need to contain 0, since most squares are empty; those in the second rank of the white side need to contain 1, representing white pawns, while those on the black side should contain -1 for black pawns. We'll put all the code to do this – nothing more than a few assignment statements, tightened up by a couple of loops – into a separate procedure. We'll go into the other initialisation processes when it comes to writing the actual code.

C PROGRAMMING

Let Toby Simpson introduce you to another dark secret and great challenge of C Programming – structures. Enjoy!

If you read my article on pointers in issue 40 of *Amiga Shopper*, you should have spent plenty of time getting to grips with them by now. So, are you ready for a new beastly challenge? Well, structures enter the stage. Read on and find out whether you can bear the grief on the road to become a true C programmer!

STRUCTURES

Other than pointers, one of the features of C which gives beginners more grief than anything else is structures. So, let's start at the beginning, what *is* a structure? Well, a structure is a collection of related data items grouped together under one name for easy reference. That may not help much, so let's illustrate it with a quick example. Imagine we had a simple phone directory program, and we wanted to store, say, up to 200 names and phone numbers. Well, your first instinct might be to use two arrays:

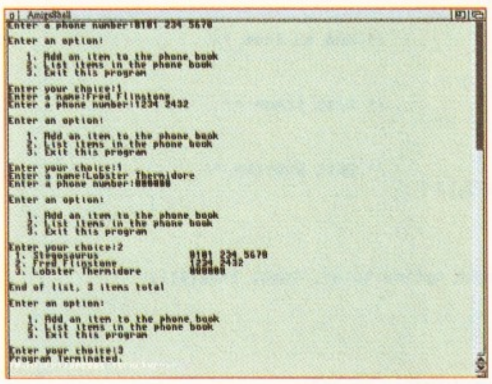
```
#define MAX_NAMES 200
char *names[MAX_NAMES];
char *phone_numbers[MAX_NAMES];
```

Great stuff, and then, if we wanted to see name number 100:

```
printf("Name 100 is %s, phone number %s\n",
names[100], phone_numbers[100]);
```

All quite simple. Problems start to arise, however, if we want to add a 201st name, as we have declared the array to be a fixed size, of 200 entries, so we're in a bit of a pickle now. Also, we have to deal with two separate arrays, both separate entities.

If we then wanted to store e-mail addresses, and comments, and addresses for these people too, we'd need yet more arrays, and consequently stacks more code and it would all get a whole bunch more complicated, which is when errors creep in. Well, there's no point in making work for yourself. Let's introduce a structure as a superior solution to the above problem.



The program in Listing 1 in action, storing phone numbers using structures to hold the information.

We could declare structure to hold names and phone numbers like this:

```
struct PhoneBookEntry
   {
   struct   PhoneBookEntry *pbe_NextEntry;
   char             pbe_Name[25];
   char             pbe_PhoneNumber[25];
   };
```

So what exactly have we done here? We have declared a structure type called "PhoneBookEntry", which has three elements. The first is a pointer to another "PhoneBookEntry" structure – we use this entry to point to the next name in the address book.

If it's NULL, then this is the last entry. Then, we have two character arrays of 25 characters to hold the name and the phone number associated with this entry. Now we have declared to the compiler what our structure looks like, we can allocate one and put stuff in it. We do this in the same way we would declare any variable:

```
void main(void)
{
   struct   PhoneBookEntry my_entry;
   .... etc
```

Since this is declared as a variable local to the main() function, C allocates it on the stack. The result of this is that it contains random garbage initially, so if we want to clear it we must do it ourselves. We can do this by either simply clearing the entire structure, like this;

```
memset(>my_entry, 0, sizeof(struct
PhoneBookEntry));
```

...or by initialising it to something sensible, like this:

```
my_entry.pbe_NextEntry = NULL;
strcpy(my_entry.pbe_Name, "Stegosaurus");
strcpy(my_entry.pbe_PhoneNumber,
"0101010101010");
```

Now we have introduced a couple of new concepts. The first is the size of function for C. It is highly useful, particularly in cases like this where we need to know the exact amount of memory, in bytes, which a variable type (in this case a structure) occupies. You can use size of on any variable type, like this:

```
printf("Sizeof a long is %ld bytes\n",
sizeof(long));
```

On the Amiga, the result of this is 4. Our structure would have a result of 54, the two 25s for the name and phone number, and 4 for the pointer to the next phone book entry. Of course, we could put the value 54 into the memset command to clear the structure, but in a large program we would have to refer to it many times, and then create a nightmare for ourselves when we added a new feature to the phone-book, perhaps taking it to 56 bytes...

"A structure is a collection of related data items grouped together under one name for easy reference."

The moral of this is to always use sizeof, then

JARGON BUSTING

ANSI C – ANSI stands for American National Standards Institute. The ANSI-C standard was an attempt to standardise the language, before there were so many different dialects that it was impossible to keep track of! All modern C compilers are ANSI compatible, and a lot of high power compilers now support the C++ language.

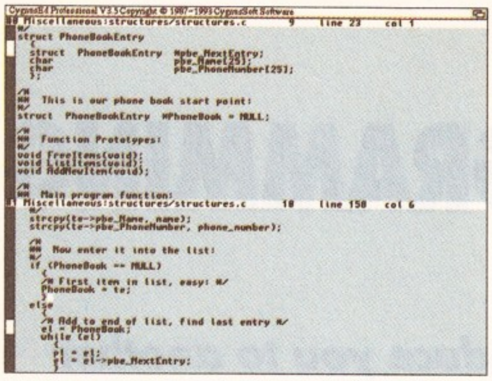
C++ – Pronounced C Plus Plus, C++ is a general purpose programming language derived from C. It provided a number of new features over normal ANSI C, such as Data Abstraction and Object Orientated Programming. (This is a complex issue, and something we will cover in a future gripping episode of C Programming!)

DICE – A complete C complier and programming system, written by noted amiga programmer Matt Dillon. A version is available as PD. A complete version of DICE is included with the "Complete Amiga C" book, written by Ex *Amiga Shopper* editor Cliff Ramshaw and Toby Simpson. See page 82 for further details on how to get hold of this book.

Includes – A series of (copyrighted) files which allow C programs to work with the operating system. The includes are copyrighted to Commodore, and are only available from Commodore themselves.

Pointer – a variable which contains a memory address where another variable is stored. Pointers are differentiated from normal variables by having an asterisk (*) in front of the name.

-> – The C operator for addressing a structure, as a pose to a normal variable or array. With this operator, structures can be handled in a similar way to pointers.



The software under development, written in the excellent CygnusED text editor from ASDG.

you are future proof, and alteration proof. The second new concept is putting information into a structure. To copy a name into the name part of our structure, we did this:

```
strcpy(my_entry.pbe_Name, "Stegosaurus");
```

The dot operator is used to connect the structure name, and the element inside the structure together for reference. In this case, we are referring to the pbe_Name part of the PhoneBookEntry structure called "my_entry". We were able to simply copy a string straight into it.

We can nest structures too, and then use multiple dots to access specific elements. The Amiga operating system does this a lot, so you might have a structure called IntuiMessage, which has a Message structure in it. You can then access that by, for example:

```
my_intuimessage.ExecMessage.mp_Flags
```

It's quite straight forward, but currently, we're using structures rather than pointers to structures. This is where things change. When you do a lot of programming using the Amiga, you'll find that a lot of the functions take pointers to structures, or return pointers to structures. In this case the dot operator will not work. The dot operator simply adds the offset of the element you've asked for to the start address of the structure, so with our phone book entry example, my_entry.pbe_Name becomes >my_entry + 4, the offset from the start of the structure where the element pbe_Name begins.

If instead of a structure we had a POINTER to a structure, then this would obviously not work as you'd need to read the pointer first, before adding the offset to it. To solve this problem, C has another operator for accessing structures, -> (a minus sign, followed immediately by a greater than symbol). Let's say now that my_entry was a pointer to the PhoneBookEntry structure, declared like this:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
void main(void)
{
   struct   PhoneBookEntry *my_entry;
   my_entry = malloc(sizeof(struct ☛
PhoneBookEntry));
   if (!my_entry)
      {
      printf("Can't allocate %ld bytes of ☛
memory!\n", sizeof(struct PhoneBookEntry));
      return;
      }
   memset(my_entry, 0, sizeof(struct ☛
PhoneBookEntry)));
   strcpy(my_entry->pbe_Name, "Stegosaurus");
   printf("Name is %s\n", my_entry->pbe_Name);
   free(my_entry);
}
```

We declare a pointer, allocate some memory, and then clear it. Note that the mechanism using strcpy to put a string into our structure works just the same as before, only this time we use -> rather than ., because my_entry is a POINTER to a PhoneBookStructure rather than the structure itself. If you can follow this, then you've got it. It's this difference between dots and ->s that confuses most beginner programmers; particularly when you have to mix them for the first time.

Let's come back to the Amiga OS for an example of this. The IntuiMessage structure is a special message structure, containing a Exec Message structure inside it. When you open windows on the Amiga, then events which occur (like someone has closed your window, or sized it, or clicked on a button etc...) are passed back to you in IntuiMessage structures. You are given a pointer to it, so, we access elements within it using ->, like this:

```
struct IntuiMessage *imsg;
... first we get our message ...
printf("Message class was %ld, Mouse X %d,☛
Mouse Y %d\n", imsg->Class, imsg->MouseX, ☛
imsg->MouseY);
```

LISTING: STRUCTURES EXAMPLE

```
/* Structures Example
** Save as structures.c
**
** For Amiga Shopper, C Programming Column
** By Toby Simpson
**
** To compile under DICE:
**    dcc structures.c -o structures.x
*/

#include <stdio.h>
#include <stdlib.h>
#include <strings.h>

/*
** Structure for PhoneBookEntry:
*/

struct PhoneBookEntry
   {
   struct   PhoneBookEntry *pbe_NextEntry;
   char  pbe_Name[25];
   char  pbe_PhoneNumber[25];
   };

/*
** This is our phone book start point:
*/
struct   PhoneBookEntry *PhoneBook = NULL;

/*
** Function Prototypes:
*/
void FreeItems(void);
void ListItems(void);
void AddNewItem(void);

/*
** Main program function:
*/
void main(void)
{
   intquit_program = 0;
   char  input_line[256];
   while (!quit_program)
      {
      printf( "\nEnter an option:\n\n"
            "  1. Add an item to the phone book\n"
            "  2. List items in the phone book\n"
            "  3. Exit this program\n\n"
            "Enter your choice:");
      gets(input_line);
      switch(input_line[0])
         {
         case '1':                  /* Add an item */
            AddNewItem();
            break;
         case '2':                  /* List items */
            ListItems();
            break;
         case '3':                  /* Quit program */
            quit_program = 1;
            break;

         default:
            printf("\nUnknown option %c\n", input_line[0]);
            break;
         }
      }
   /*
   ** Time to go, so free any memory we have:
   */
   FreeItems();
   printf("Program Terminated.\n");
   return;
}
/**********************
**
** void FreeItems(void)
**
** Loop through our list of Phone Book entries freeing items:
*/

void FreeItems(void)
{
   struct   PhoneBookEntry *te;
   struct   PhoneBookEntry *tn;
   /*
   ** Loop through book freeing any memory we used:
   */
   te = PhoneBook;
   while (te)
      {
      tn = te->pbe_NextEntry;
      free(te);
      te = tn;
```

Now let's access the mn_Length element which is part of the Message structure, which is inside our IntuiMessage. mn_Length tells us how long the message is. Since an IntuiMessage structure contains a whole copy of a Message structure, rather than a pointer to one, we have to use the dot, like this:

```
printf("Message length is: %ld\n", imsg->ExecMessage.mn_Length);
```

This uses a mixture of the two structure reference operators in C, the . and the ->. As you can see, it's not nearly as painful as it might at first seem.

THE LISTING

You'll notice that in our last example, we used a pointer to a structure, and allocated some memory for it. This enables us to chain items together in a linked list, by putting a pointer to the next structure inside the previous structure. This overcomes the original array based problem, where the arrays for phone numbers and names were of a fixed size. With this method, if we want to continually add names and phone numbers, we can, memory permitting.

Lists are also an integral part of Amiga C programming, and something we dealt with in much more detail a couple of months ago. Let's use an example of structure handling for a name and address type program to illustrate some of the methods we've learnt. Listing 1 was created in SAS/C 6.51, and was tested using Matt Dillon's excellent DICE compiler. This listing is also entirely in standard ANSI C which means it should compile and run on many different platforms (indeed, before I finished off this article I tried compiling the program on Borland C++ on an IBM-PC compatible, and it worked fine!). This sort of development can be quite handy, as you can write programs which can be easily ported to other platforms.

> **"Structures and lists are an integral part of the Amiga Operating System and a knowledge of how to use them is essential."**

It may interest you to know that the DICE compiled version on my system was almost half the size of the SAS C version. Of course, with compiler optimisation on and by linking with smaller function libraries it is possible to shrink the SAS one down, but as a once off fast compiler, DICE does the job very well indeed producing compact efficient code.

Certainly one thing inside this listing is worth mentioning – the routine which frees any memory we have allocated for phone book entries looks like this:

```
while (te)
    {
    tn = te->pbe_NextEntry;
    free(te);
    te = tn;
    }
```

You'll notice that we have not simply done:

```
while (te)
    {
    free(te);
    te = te->pbe_NextEntry;
    }
```

The reason for this, is the second example is a disaster waiting to happen. How? Well, imagine this. Your program executes the free(te) command. That memory is now free, and returned to the system. You then access that memory on the very next line. Since your computer is a multi-tasking machine, should another task have taken control of that memory in between the two commands, then something very horrible indeed could have happened. It's *unlikely*, I will admit, but still possible. Future versions of the Amiga operating system may not even *let* you access memory that you no longer own, so don't fall foul to this.

CONCLUSIONS

Structures and lists are an integral part of the Amiga Operating System – a knowledge of how to use structure, both your own and the Operating System's, is absolutely essential. If you understand the two structure reference operators, the dot and ->, then you should be OK.

Happy Programming! AS

```
      }
   return;
}
/**********************
**
** void  AddNewItem(void)
**
** Add a new item to the list
*/
void AddNewItem(void)
{
   struct   PhoneBookEntry *te;
   struct   PhoneBookEntry *el;
   struct   PhoneBookEntry *pl;
   char     name[256];
   char     phone_number[256];

   /*
   ** Allocate > clear us a new structure entry:
   */
   te = malloc(sizeof(struct PhoneBookEntry));
   if (te == NULL)
      {
      printf("Can't allocate memory!\n");
      return;
      }
   memset(te, 0, sizeqf(struct PhoneBookEntry));

   /*
   ** Get user information:
   */
   printf("Enter a name:");
   gets(name);
   printf("Enter a phone number:");
   gets(phone_number);

   /*
   ** Put this lot into our new book entry:
   */
   strcpy(te->pbe_Name, name);
   strcpy(te->pbe_PhoneNumber, phone_number);

   /*
   ** Now enter it into the list:
   */
   if (PhoneBook == NULL)
      {
      /* First item in list, easy: */
      PhoneBook = te;
      }
   else
      {
      /* Add to end of list, find last entry */
      el = PhoneBook;
      while (el)
         {
         pl = el;
         el = el->pbe_NextEntry;
         }

      pl->pbe_NextEntry = te;
      }
   return;
}
/**********************
**
** void  ListItems(void)
**
** List items in our phone book
*/

void ListItems(void)
{
   struct   PhoneBookEntry *te;
   int      loop  = 1;

   /*
   ** Exit immediately if there is nothing in the phone book:
   */
   if (PhoneBook == NULL)
      {
      printf("No items in phone book\n");
      return;
      }

   /*
   ** List items in book:
   */
   te = PhoneBook;
   while (te)
      {
      /* Show this item */
      printf("%2d. %-25s %-25s\n", loop, te->pbe_Name, ☛
te->pbe_PhoneNumber);
      /* Proceed to next */
      te = te->pbe_NextEntry;
      loop++;
      }
   printf("\nEnd of list, %d items total\n", loop - 1);
   return;
}
```

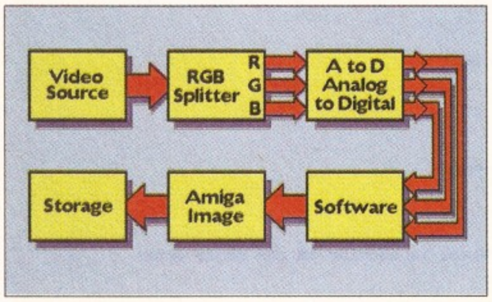
GRAB YOUR GRABS

Gary Whiteley gives you an insight into the intricacies of Video Digitising.

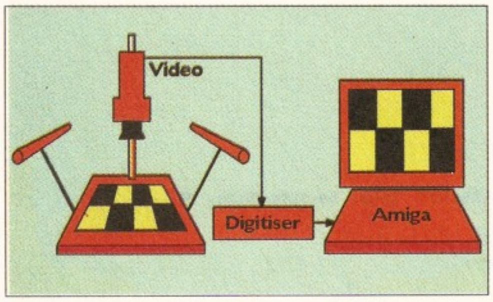
It's been some time since *Amiga Shopper* looked at video digitisers, so I thought that for this month's tutorial I'd shift the goal posts a bit and not only provide you with some hints and tips about video digitising, but also give you some help to decide which digitiser might be right for your Amiga system, and why.

If you have no idea what I'm talking about then let me explain: Video digitising is the way to grab a frame of video and transfer it to your Amiga for use in a variety of ways – graphics, animation, desktop video, desktop publishing, 3D modelling and more. But it's not simply a matter of feeding a video signal into your Amiga and hoping for the best. First you'll need some hardware – the digitiser itself – and its accompanying software. You'll also need a video source, such as a video camera or a VCR with a good pause on it.

There is a wide range of digitisers available for the Amiga, but not all models fit all Amigas, and not all digitisers are created equal – though most of the recently-designed ones come complete with their own built-in electronic RGB splitter, which enables video to be grabbed directly in colour. With some earlier digitisers, such as NewTek's Digi-View and Rombo's Vidi-Amiga, the RGB splitter was an optional extra.



Here's a simplified flow chart of how the video signal gets converted into an Amiga image.



Digitising with a video camera or VCR is easy in principle – just connect the digitiser to your Amiga, the video signal to the digitiser and start grabbing – though not always so easy in practice.

Still, if you plan on using a black and white video camera (such as those used for security applications) an RGB splitter won't be of any use to you, and you'll have to use three RGB filters in front of the lens so as to reproduce a full-colour image. Mind you, such a system *does* work, and very well indeed if care is taken during the digitising. But if you want to grab colour video you'll need an RGB splitter – whether it be integral to the digitiser or external to it.

Amiga digitisers range in price from around £70 – £100 for slow scan models, and from £300 – £700 for fast scan models, although some more expensive specialised hardware, such as GVP's IV-24m, DPS's PAR and DMI's Digital Broadcaster 32, also contain high-quality digitising hardware. Typical slow scan digitisers include Rombo's Vidi-Amiga 12, NewTek's Digi-View and MicroDeal's VideoMaster. The latter two don't have integral RGB splitters and the VideoMaster is only available for A500 or A600/A1200 Amigas. Several excellent fast scan digitisers are available, and MacroSystem's VLab Rombo's Vidi-Amiga RT models are amongst the best of them. VLab comes either as a Zorro-II card for 'big-box' Amigas or as an external device for other models, whilst the Vidi-Amiga 12 and 24 RT digitisers work externally with *any* Amiga. To save space, I've compiled the features of several digitisers into a table which you'll find at the top of the next page.

WHICH ONE IS FOR ME?

There are several factors you should consider when buying a digitiser. Why do you need it? Will it be for serious work or just for fun? What kind of stuff do you want to grab? If you want high quality stills and close-ups from photographs and artwork a video digitiser is probably not the best route, and you should seriously consider a flat-bed scanner instead, but if you want grabs from video then a video digitiser is the only way. For ultimate speed a fast scan grabber will be best, though the quality provided by some slow-scan grabbers can be almost as good under the right circumstances. For professional results you'll need a digitiser which can accept at least S-Video inputs, and the best video source you can lay your hands on.

If you plan on doing a lot of high quality digitising you'll really need some extra memory (I'd advise at least 4MB total) and a hard drive, as the image files can often be quite large. For the best display you'll need either an AGA Amiga or an Amiga fitted with a suitable display card (e.g. Picasso II, Retina, OpalVision, Spectrum EGS, etc), otherwise you'll be restricted to the maximum number of colours your Amiga can display at it's highest resolution – typically 16 in hires interlace on a pre-AGA machine.

But digitising needn't cost an arm and a leg if you just want to have fun, or do some simple DTV work. Even an old lag like Digi-View can still provide excellent results if treated with respect, and Rombo's Vidi-Amiga 12 turns in a very respectable image (and offers S-video input) for well under £100. If I had to recommend a slow and fast scan digitiser I'd not hesitate to name the Vidi-Amiga 12 as the slow scan winner, though the fast scan choice would have to be any one of VLab YC, Vidi-Amiga 12 RT or Vidi-Amiga 24 RT, depending on your budget, the type of Amiga you own, and your digitising requirements.



Video images grabbed by a digitiser can be used for all kinds of applications, including desktop publishing, desktop video, 3D and graphics work and CD-ROM and games production.

HINTS AND TIPS

The image quality derived from video digitising depends as much upon the quality of the video signal entering the digitiser as it does on the quality of the digitiser itself. How this quality is achieved depends on whether the video source is a video camera pointing directly at the source image or a VCR playing back a pre-recorded tape, though a general rule is that S-Video signals give cleaner results than composite video and so should be used wherever possible.

VCR VIDEO SOURCE

If your video source is going to be a VCR then my first tip is to use the highest quality video format you can lay your hands on. S-Video output from Betacam produces far superior results to S-Video from S-VHS and Hi-8 formats, which in turn are markedly better than composite video sources. Note that RF video (such as comes out of the RF socket on a domestic VCR) is NOT suitable for digitising – even if the connectors do appear to fit in the phono socket of some digitisers!

If you're using a slow scan digitiser then your VCR will have to have a rock-steady Pause function or else the image will break up during the several seconds (or more) that it may take to grab the image. Fast scan digitisers don't present this problem and almost any VCR will be suitable in this case (though see the previous tip). Another tip when using VCRs – use good quality tape. Cheap tape inevitably produces damaged or degraded images, and could also cause damage or clogging to the VCR's fragile video heads, so it really isn't the bargain it might appear to be.

The last VCR tip (and this also applies to video camera sources) is to use connecting cables appropriate to the job. You wouldn't use bell wire for wiring up your lighting (I hope!) and you wouldn't use mains cable for connecting up expensive stereo speakers, so it follows that you should use the correct video cabling for the job. If you don't, it's very possible that the video signal could be affected – resulting in poorer quality grabbed images than would otherwise be expected. If you aren't quite sure about what cable to use, visit a specialist electrical store (one that sells spares, tools and components, not Dixons or Currys) and ask their advice.

VIDEO CAMERA

If you're using a video camera the two most important factors are stability and illumination. Stability can be provided by a tripod, a copy stand or even by placing the camera securely on a solid

FEATURE TABLE – WHICH IS THE ONE FOR YOU?

DIGITISER	AMIGA	TYPE	FITTING	SPLITTER	INPUTS	DOS	MEMORY	SEQUENCE	MAX SIZE	24 BIT	PRICE
ColourPic	Any	Fast	External	Yes	CY	1.3+	1MB+	Yes	320x256	No	£499
Colour pic Plus	Any	Fast	External	Yes	CYR	1.3+	2MB+	Yes	704x580	Yes	£699
Digi-View	Any	Slow	External	No	C	1.2+	512K+	No	768x580	No	£180
DCTV	Any	Slow	External	Yes	CY	1.3+	1MB	No	736x566	Yes	£399
Frame Machine	Zorrow slot	Fast	Internal	Yes	CY	1.2+	1MB+	Yes	720x570	Yes	£380
Frame Store	Any	Fast	External	Yes	CY	1.2+	512K+	N	720x570	Yes	£380
Vidi-Amiga 12	Any	Slow	External	Yes	CY	1.2+	1MB+	Mono	704x566	No	£100
Vidi-Amiga 12RT	Any	Fast	External	Yes	CY	1.3+	1MB+	Yes	368x576	Yes	£199
Vidi-Amiga 24RT	Any	Fast	External	Yes	CY	1.3+	2MB+	Yes	720x576	Yes	£299
VLab PAR	Any	Fast	External	Yes	C	2.0+	1MB+	Yes	720x625	Yes	£370
VLab Y/C	Zorro slot	Fast	Internal	Yes	CY	2.0+	1MB+	Yes	720x625	Yes	£370
VideoMaster	A500	Slow	External	No	C	1.2+	512K+	Mono	640x512	No	£70
VideoMaster AGA	A600/1200	Slow	External	No	C	2.0	1MB+	Mono	640x512	No	£80

C=Composite Y=Y/C Video R=RGB

surface – it all depends on the circumstances of the shoot. Stability is not so important when using a fast scan digitiser, although keeping the camera pointed in the right direction obviously is, so a tripod or stand will still come in handy.

Although many modern video cameras are capable of shooting in low light conditions the images produced tend to become increasingly 'noisy' as the camera gain increases to try and compensate for the low light level. Unless such a situation is completely unavoidable (in which case you'll just have to put up with poor results) you should ensure that adequate lighting is available to sufficiently illuminate your subject.

Many copy stands already have lights fitted, so this won't be a particular problem, but for larger subjects you may have to add whatever lighting you can lay your hands on. It's preferable if all the lamps have the same 'colour temperature' so that the the scene will be correctly colour balanced. If you can use daylight, so much the better – if you need an extra boost make reflectors out of sheets of polystyrene, newspaper (or any other light-coloured materials) and use them to bounce light onto areas which need a bit of a boost.

If your camera has S-Video output, use it if your digitiser can accept S-Video input. The results will be better than using composite video. Also, don't forget to white balance the camera once the lighting setup has been finalised. This will ensure that the colours the camera picks up are as close as possible to those which are actually in the scene. White balancing is usually done by taking a close-up of a sheet of white paper (or other white object) which is placed in the centre of the shot, and then pressing the white balance button until the camera confirms that the balance has been adjusted. Some cameras only white balance automatically, whilst others have to be done manually. Read your camera's instruction manual if you aren't sure about white balancing procedures.

IMAGE SIZE

Whether you're grabbing from tape or camera, grab at the highest resolution available to you (Amiga and memory permitting). This will provide the best quality pictures which you can then convert down as necessary. For instance, if you grab at 640 x 512 in 24-bit you'll start with a top quality image which can be downgraded to any other suitable format. But if you grab an image in lo-res HAM you'll never be able to get hires interlace quality from it because the required information just wasn't recorded when you grabbed the image. The moral being... always grab as much as you can!

USES OF DIGITISING

Grabbed images can be used as the basis for artwork in a wide variety of applications. Company logos can be imported into 3D software and converted to 3D models or mapped onto objects so that they can be flown around. Video images can be printed from a DTP program or incorporated as backgrounds for animation or other DTV work. Digitised images of people could even be printed directly on to T-shirts with the right hardware setup. A sequence of grabs could be animated together, making video digitising an ideal basis for stop motion or cel animation testing or production, if the image doesn't need to be film quality. Grabbed images can also be used for rotoscoping. Some digitisers offer time-lapse grabbing facilities, whilst others have built-in image processing functions, or other specialist features, such as animation grabbing and playback.

I'm sure that you can think of more applications for digitising yourself! AS

DIGITISING – HOW IT WORKS

To grab a video image from a camera or VCR into a format suitable for display on a computer screen requires some dedicated hardware and software – known collectively as a digitiser or frame grabber. The hardware interfaces with the computer and provides the means of converting the incoming analogue video signal into digital RGB data which is then passed to the computer for further processing by the digitising software and conversion into an image format suitable for display on the host computer.

There are two types of digitiser, often termed Fast Scan and Slow Scan because of the time they take to actually grab a video image. Fast Scan digitisers are capable of grabbing a frame of video in real-time because of the special memory area they contain (known as a Frame Buffer or Framestore) which continually samples the incoming video signal, holding each video frame for just 1/25th of a second before replacing it with the next frame in the sequence. When the grabbing process is triggered by the software the buffered image is instantly frozen in the framestore and transferred to the computer's memory. The framestore retains the grabbed frame until it is told to carry on sampling, so the frame can be grabbed over and over if necessary.

Fast scan digitisers are not capable of grabbing contiguous sequences of frames because of bottlenecks between the framestore and the conversion, transfer and storage of each image to the computer. Data just cannot be transferred fast enough for continual real-time recording, though there is at least one ingenious solution to this, as used in VLab Y/C's IFR single frame recording system, which works its way through videotaped sequences in several passes until it has grabbed all the frames from a specified sequence.

Although a Fast Scan digitiser can *grab* a frame quickly, it can still take some time to convert it into a format suitable for use on the Amiga. This is because the grabbed data will usually be in a non-IFF display format (such as RGB or YUVN) and, as such, needs to be converted to an IFF or other file format before use. Depending on the speed and memory of the host Amiga and the size of the grabbed image this process can take anything from several seconds to several minutes. Fast Scan thus refers to the grabbing speed, not the overall digitising process.

Slow Scan digitisers are (not surprisingly) slower than Fast Scan models, but they are much cheaper because they don't contain the Framestore circuitry. However, since this means that the video image is not buffered by the digitiser then to be cleanly and successfully grabbed it must be rock steady when it enters the digitiser – and remain that way until all the image has been grabbed, otherwise it will become distorted, blurry and otherwise messed up. Which is why it is important to have an absolutely stable video image when using a slow scan digitiser. A VCR with perfect pause, or a securely-mounted video camera are prerequisites here. Anything less will result in failure, or at very best an avant-garde artistic mess.

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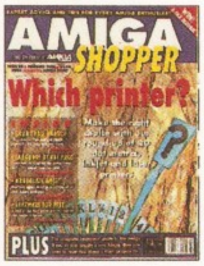
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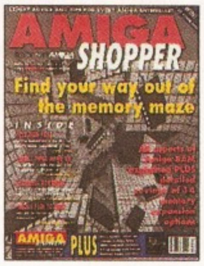
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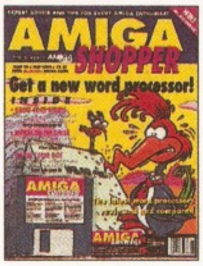
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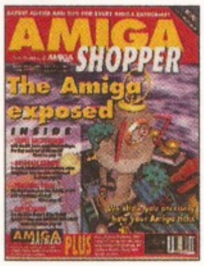
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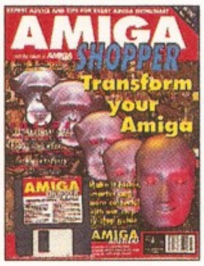
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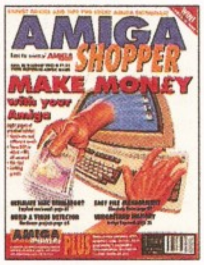
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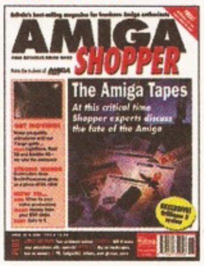
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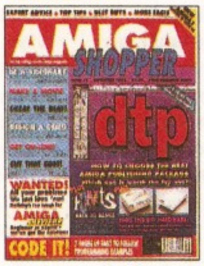

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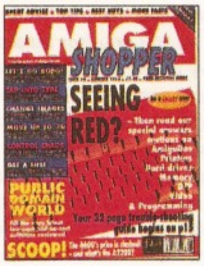

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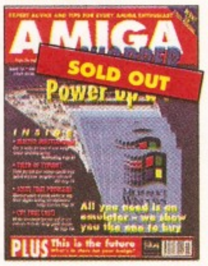

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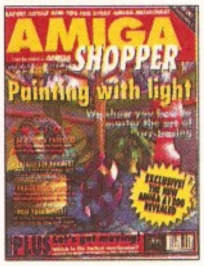
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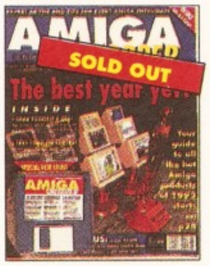
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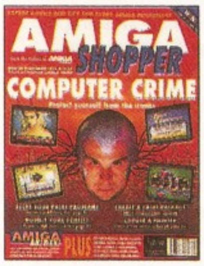
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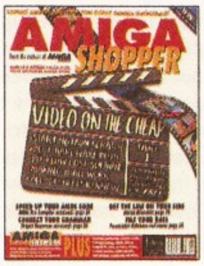
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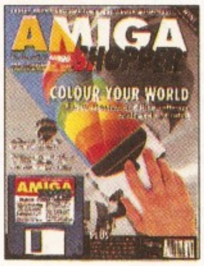
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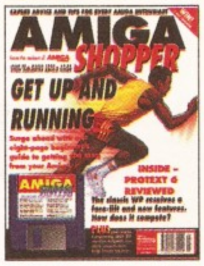
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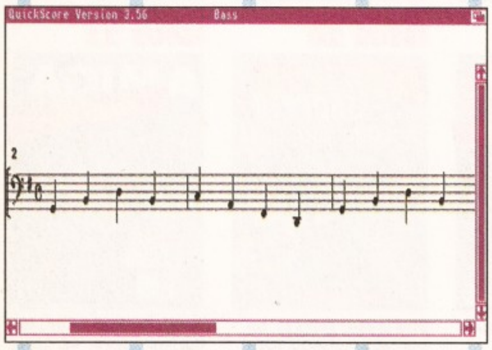
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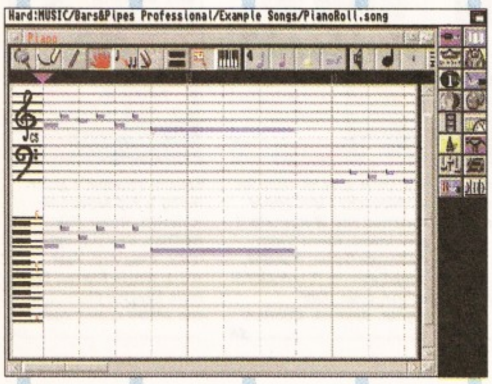
To some they're just a bunch of blobs on paper, to others it's as clear as the written word. Tim Tucker looks at how understanding musical notation can benefit your music making on the Amiga.



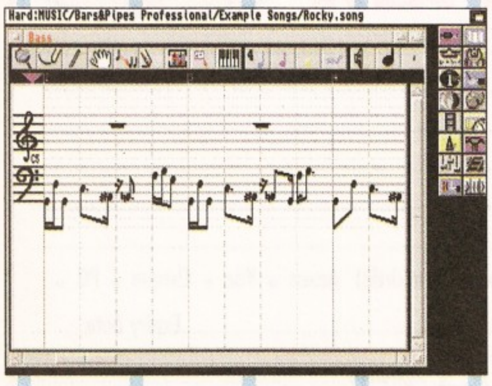
Here's a great way to teach a bass line to your bass player. Record the part in your sequencer, convert it to notation, print it, and hand it to him.

Nobody can deny that music speaks to us in a language all its own, but how do we communicate musical ideas to each other? How do we tell another musician what we want him to play for a certain musical part, or outline a harmony, melody or rhythm to others? The most straight forward way is to actually play the piece of music on an instrument and ask the musician to copy it. This is fine if the musician you're trying to put your ideas to has a good musical ear, and can quickly translate the sounds to his own instrument, but for most of us, playing by ear doesn't come so naturally.

Many musicians use the common musical language to get their compositions across, such as stating what tempo and time signature the piece uses, which key it's in, what chords are being used to create the harmony and which individual notes make up the melody. Such a statement might take the form: "It's in 4/4, at a fairly fast pace, the chords are C to F to G7 and back to C again, and the melody starts on the note E and climbs up the scale of C in quarter notes." Hearing something like that, not many would actually be able to play the piece straight off, and there would be the inevitable fumbling around and demonstrating to other band members to get the part fully understood.



Just two of the graphic editing modes in Bars and Pipes. You may find these simple to use, but for other musicians they're much harder to read.



Fortunately, Bars and Pipes features traditional notation as well. If you get in the habit of using it to edit tracks, you'll pick it up in no time.
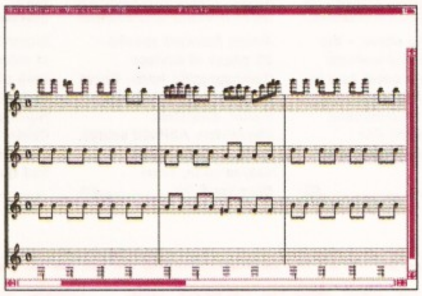
This is where musical notation comes in. This universally accepted system has a tradition that stretches back to the Middle Ages, and despite attempts to establish easier/better/more intuitive methods of communicating the sounds of music (see separate box), it has yet to be bettered. If you find the set of dots, lines and squiggles that grace a standard score confusing, don't ignore it – it's proved itself by far the most effective way of writing down music, and even a basic knowledge of score reading and writing can help your music making in so many ways.

DOTS BEFORE YOUR EYES

Although this blatant flag waving for musical notation may seem largely irrelevant when considering music making on the Amiga, this is absolutely not the case. In many ways the two can go hand in hand, to create a far better understanding of the entire process of making music. The basics of musical notation can be appreciated much more clearly in the context of a sequencer, where bars, beats, rhythms and counterpoints can be observed more easily, and in their true context. And how many sequencers now contain score writing facilities which enable you to view, edit, print out, and even create music using traditional notation? Nearly all of them, is the answer. Surely it's clear that musical notation has not ceased being of any use to computer musicians, and can in fact be an integral part of working with a sequencer.

Let's look at the main ways in which notation can be used within a sequencing program. One huge benefit is undoubtedly the ability to automatically translate music you record on a sequencer into a musical score, which you can then print out into a hard copy. If you are working with a band of musicians who have a good deal of experience reading music, this is the best way to communicate your ideas, by simply passing each musician the relevant sheet music, as printed out from your sequencer. And the great thing is, you haven't had to spend time laboriously working out that highly syncopated funky bass part into the proper notation – the sequencer's done it for you.

However, you may think that if your software can translate MIDI data into written notes, you don't have to know much about the score writing process itself, but anyone who's tried this will know it's not quite as easy as that. Most score writing programs require a fair amount of fiddling after the translation, especially if the parts are not quantised to strict time. Notes might not necessarily be beamed together, making it much harder to read even for professional sight readers. Score programs rarely translate the dynamics of a piece in standard notation (dynamics are the symbols which indicate how loudly or softly the notes should be played, and where build ups and fade outs in volume should occur). The musical phrasing, whether the notes should be played long or short, ornaments such as vibrato and trills, all these things commonly require a little extra input from you, to be successfully integrated into the score. So you see, it still benefits you, and the musicians you're trying to get your ideas across to, immensely if you have a basic knowledge of the score writing process, and can recognise where and how the written score can be edited for greater clarity.



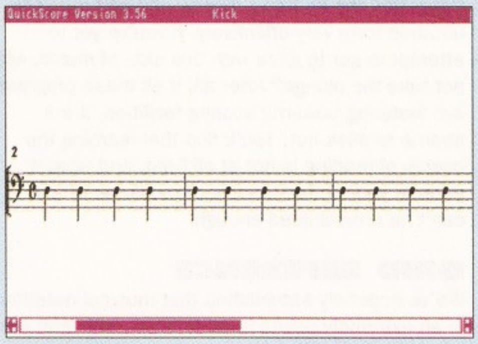
Does this look like a bunch of blobs to you? Then perhaps it is about time you let Tim teach you about music notation.

READING AND WRITING

The other great benefit of being able to read music is that it enables you to pick any score or piece of

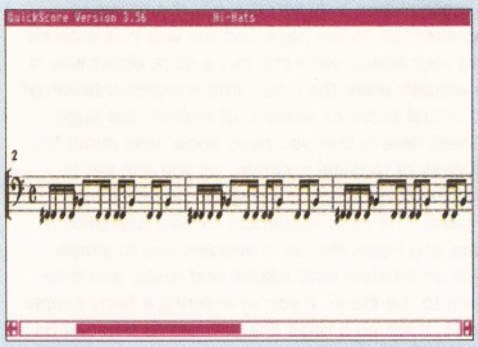
NOTATION – THE BASICS

Getting to grips with notation is actually very easy, and any good book on musical theory can teach you the basics. Here's a quick guide to the fundamentals behind writing down music.



At the heart of all music is a basic pulse or beat (well most music, but anything that doesn't have a pulse requires a much more sophisticated form of notation). You can hear this quite clearly if you play your sequencer without any MIDI parts recorded. Just set the sequencer up to play in 4/4 time, enable the metronome, and you should hear a series of evenly spaced clicks delineating the pulse. Some sequencers emphasise the first of every four beats with a louder click. This is natural phrasing, and indicates the grouping of beats into 'bars'. In 4/4 time there are 4 beats to a bar; in 3/4 time there are 3 beats to a bar, etc.

To notate each of the beats you would use the symbols in the above example. A metronome click has no specific pitch, but this example shows a bass clef with each note pitched to D (the middle line of the stave). If you were to play a low D (below middle C) on a keyboard at exactly the same time as the metronome clicks, you'd be playing the part as written above.



Just as each bar is divided into separate pulses, so each pulse can be subdivided into smaller beats. If you look at the example above you'll see that the first four notes are grouped together with a beam, as are the second, third and fourth bunch of notes. These beams help to show where the pulse is, and the first note of every beamed group occurs on the metronome click, as in the above example.

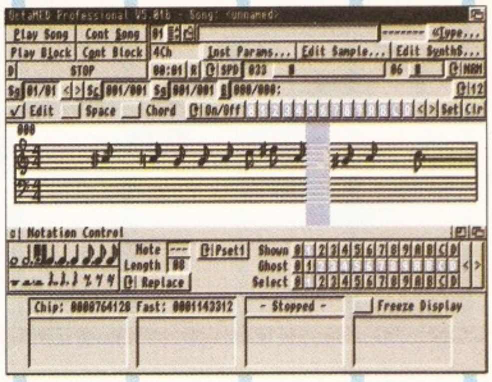
The rest of the notes have different rhythmic values, of course, but it would take more space than we have here to explain them all fully. Suffice to say that one beam splits a beat into two equal sub-divisions, and two beams indicate that there are four equal sub-divisions.

One thing to bear in mind when learning music is that it's easy to learn where the pitches fall on a stave (simple mnemonics like Every Good Boy Deserves Football can help), but mastering the rhythmic values takes a little more time and patience.

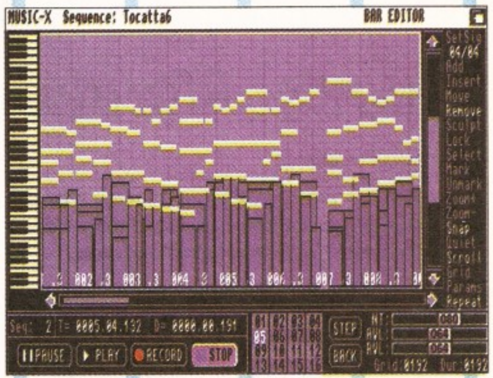
sheet music and put it into your sequencer. Go into any music shop and you'll see that printed music is available for all styles of music, everything from fully orchestrated classical masterpieces, to film soundtracks, jazz standards and contemporary pop and rock hits. There's a whole wealth of music available for you to access, much of which would require an enormous amount of skill, patience and time, to work out by ear from a recording. By reading the score and translating into your sequencer, you can make the entire process a lot easier and quicker, even if your knowledge of reading music is rudimentary. In fact, the entire process will inevitably increase your abilities.

But how do you actually put the music in? How do you get the music from the page to the program? Well of course, the easiest and most straight forward way is to play the music direct from the score and record it in real time into the sequencer. This method requires a good deal of reading ability, as it necessitates the ability to "sight read" music. However, it is a good thing to aim for, as with this level of reading it takes just as long to record the piece as it does to play it, even if you've never heard the music before in your life. If you're new to reading, it's a lot easier to start off with small sections of the score, perhaps four bars at a time. Take time to work out each section slowly and if you can, refer to a recording of the music to make sure you're interpreting the score correctly. The beauty of working with a sequencer is that you can record one four bar section, then learn another small section and record from the end of the first. Carry on like this until you've completed the piece, and you'll soon find that your ability to read music improves rapidly. You can always go and edit your MIDI data if you've made any mistakes.
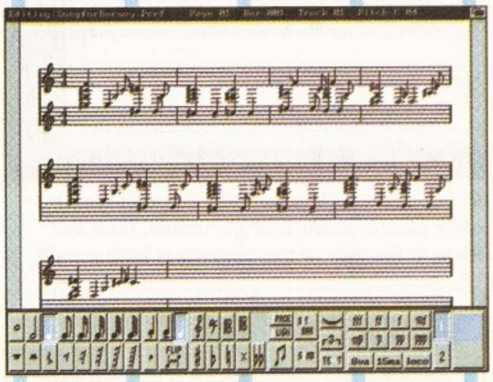
If playing in real time is too frustrating at first, there are other ways you can get the music in. Most sequencers feature a step time recording option. This enables you to enter each note one at a time and stipulate the exact length, duration and pitch, which is exactly the same way that a score represents music. All you need to do is to translate the properties of the note on the page into the ones used by the sequencer; for example, if the note in the score indicates a middle C, lasting exactly one beat, you simply type in a middle C as your pitch (usually C4 in a sequencer), and type the time in clocks to be equivalent to a beat, which would be 192 clock pulses in most sequencers on the Amiga. To make this process quicker, it's often a good idea to draw up a table of translation which you can refer to while you're working, so that you can quickly determine which note length corresponds to which timing value in the sequencer (you'll find many sequencer manuals already provide this information for you). You could also mark the score with the pitches which correspond to each line of the stave, so that you can refer to it when entering the pitches in your step time recording. This whole process obviously takes a fair bit longer than playing the music in real time, but it does have the advantage of being easier, and often more accurate, and you will
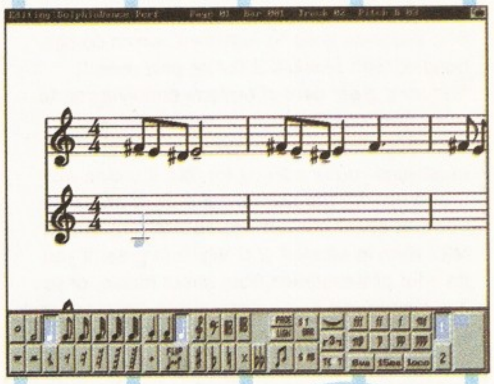


OctaMED provides a very useful tool for jotting down musical ideas, and the notation option allows you to pass these notes on to others.



Probably the best graphical editor in the world. For editing and manipulating MIDI data, Music-X's system is perfect, but could you sight read it?



The latest version of Music-X comes bundled with Notator-X, a wonderfully comprehensive scoring and notation package that does the lot.



Entering notes into Notator-X is a doddle, and any number of accidentals, signs and ornaments can be used in your scores.

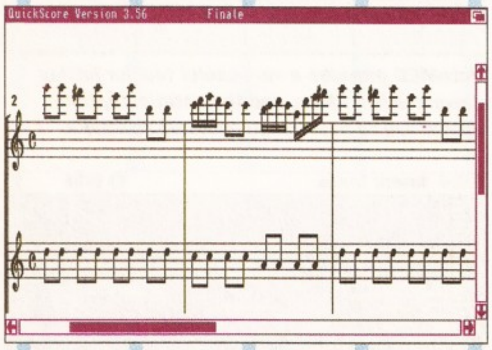
find that this too improves your ability to read and interpret musical notation.

WHAT'S THE SCORE?

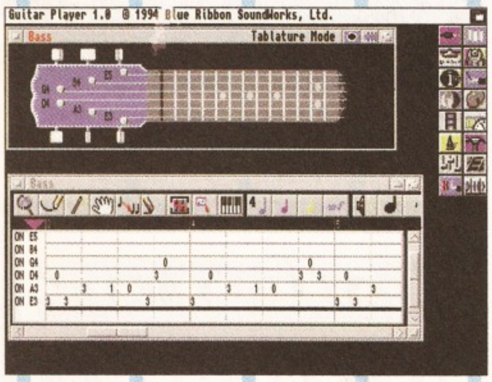
Entering music in step time is handy because there is a correlation between the way the music is represented on the page and the way it is entered into your Amiga software, but a more direct way is to actually enter the notes into a representation of an actual score on screen. Of course, the huge benefit here is that you need know little about the process of musical notation, as you can get by pretty well by simply copying the notes directly from a score. The best sequencer for this approach is *Bars and Pipes Pro*, as it enables you to simply click on musical note values and rests, and drag them to the stave. If you're entering a fairly simple score, such as a bass line or melody, this can be a marvellously quick way of working. It's not the ideal package for actually scoring music, because each track only enables you to play with two staves at a time, and you can't combine staves together to create one big orchestral score, but it does make it very easy to enter notation quickly.

Music-X version 2 also has a scoring option, in the form of the separate notation software provided, *Notator-X*. This isn't quite as well integrated as the editing staves in *Bars and Pipes*, but it does allow for more complex and intricate scores because it is more dedicated to the task. The more limited integration with the sequencing aspect of *Music-X* itself means that you'll have to convert the written score from *Notator-X* to MIDI data in *Music-X*, but this is just a menu option away, and doesn't take too long to accomplish. It does, however, mean that any mistakes you've made won't be apparent until you've done the conversion and listened back to the sequencer track, and you'll have to edit the score and convert it again to get it absolutely right.

Dr T's *KCS* is the most limited sequencer in the field of music notation, because although the latest release features Quick Score, a good score writing package, it can't be used to enter notes into the sequencing part of the program at all. Its only use is to display already recorded pieces from the sequencer in score form, which is fine if that's all you want to do.



Dr T's KCS features QuickScore. This is certainly useful, and displays most music extremely well, but it can't cope with more complex music.



Guitar tablature is a common notation system, often used in books and magazines. Bars and Pipes is the only Amiga sequencer to feature it.

WHAT'S BEST?

There are a few music programs and packages which enable you to use musical notation to a greater or lesser degree, but if you're planning on working with written music a lot, you'll want to know the best supported software. Currently that accolade goes to *Notator-X*, which comes bundled with *Music-X 2.0*. Not only does it feature a great deal of options enabling you to really fine tune the look of your score, and customise it to suit the needs of those musicians you're scoring for, but it's also well linked up with the sequencer side of *Music-X*. You can either convert scores into sequenced MIDI data in *Music-X 2.0*, which is great if you do a lot of translation from sheet music, or you can load *Music-X* files directly into *Notator-X* and see them magically transformed into written music. Most importantly it's easy to work with, and even if your knowledge of musical notation is bare minimum, it'll help you with the basics and have you writing scores in no time. The whole package, including *Music-X 2* and *Notator-X*, is available from The Software Business, ☎ 0480 496497, and costs £149.99 (or £79.99 if you're upgrading from the original *Music-X*).

TIME FOR TRACKERS

Of course, there may be times when you don't want to translate an entire score into a polyphonic sequenced masterpiece. Perhaps you just want to analyse melodies, chords and rhythms that you see in written scores, and hear them played back from your Amiga, or jot down ideas like a musical note pad. If this is the case, many Tracker programs will do just the job. *OctaMED* is undoubtedly the best available (you can get a copy of the latest version 5.0, free with the August issue of *Amiga Format* magazine). A Tracker program enables you to record and play back music through the Amiga's internal sound hardware, using Amiga IFF samples and hybrid synthesised sounds, and with *OctaMED* you can enter the music either as individual entries in a scrolling list, much like an event editor in a standard sequencer, or into a two staff score.

Again, this works by simply clicking on different note values and plonking them into the stave, and is a surprisingly quick way of hearing notated music out of your Amiga. *OctaMED* also enables you to play the pieces back through MIDI, so you have the option to improve the quality when the ideas start to shape up.

For Amiga musicians wanting to work with notated music, there are a wealth of options available, and there is no doubt that traditional music notation is not going to go away just because of the computer music revolution. As we've seen, many programs have already integrated the ability to display and edit music in notation form very effectively. If you've yet to attempt to get to grips with this side of music, why not take the plunge? After all, if all these programs are featuring powerful scoring facilities, it's a shame to miss out. You'll find that learning the basics of reading is not at all hard, and what it adds to your understanding of music as whole can't be emphasised enough.

GRID REFERENCE

We've hopefully established that musical notation is an extremely useful thing to know, but what are the alternatives? Well most sequencers have their own special ways of representing music graphically. Usually, this is found in the edit screen, and derives a lot from traditional musical notation, in that the music is placed on a horizontal grid travelling from left to right. This grid is often segmented into bar lines, which serve just the same function as bar lines in standard scores, and each bar is further broken down into beats and smaller rhythmic units. Notes are normally represented by rectangular blocks, whose length is determined by the horizontal length of the block, and whose pitch depends on where it occurs vertically in the grid. A graphic of a piano keyboard down the left hand side of the grid enables you to easily check the pitch of the notes on that line.

While this system is relatively intuitive, it is very much confined to the sequencer itself. Try giving a print out of music represented this way to another musician, even if he's aware of the system, and it will take him or her ages to work out how to play the music. At least the graphical editing system is pretty much standardised now, so familiarity with one sequencer should hold you in good stead for another. (One notable exception is Notator on the Atari ST, which has the dubious wisdom of turning the whole thing into a vertical grid rather than a horizontal one – but then again, it has the advantage of a state of the art traditional notation editor. Anyway, enough of this ST rubbish.)

TABLATURE

Any musicians who play guitar will undoubtedly have come across the tablature system of musical notation. This represents music on a graphic which is a mixture of a guitar neck and a horizontal staff. Each line in tablature notation represents one of the six strings of a guitar, and notes are represented on the lines as numbers which tell you which fret number to place your fingers on. Bar and beat lines are used to help you see where you are in the music. Not many sequencers have the facility to display music as tablature, in fact the only one I know of is *Bars and Pipes Pro*.

I personally hate the system. It's both confusing and inaccurate, as there is no way to indicate the rhythmic values or durations of the notes. It's also entirely un-musical, as it only conveys the mechanics of playing music, and not the actual musical relationships themselves, and is obviously only intended for guitarists, which seriously limits its use in communicating musical ideas to other musicians. And after all, if you're going to learn a system of musical notation, why not learn one that's applicable to everyone? (By the way, I'm a bass player, so this is in no way an anti-guitarist rant.) AS

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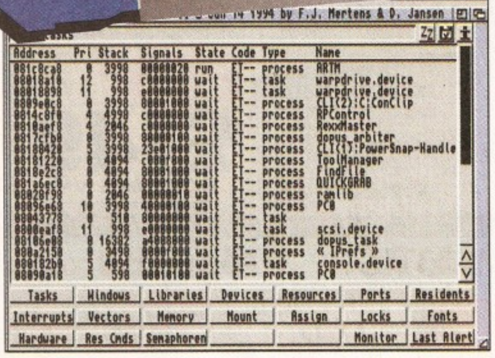
SUBSCRIPTIONS

Richard Baguley shows you how to extract and use the contents of this month's Subscribers' disk.

NO GO BOOT

In order to allow us to pack in the maximum amount of stuff, the Subscribers' disk is not bootable. To access the stuff on the disk, you should boot up your Amiga using your workbench disk, insert the Subscribers' disk and then double click on the icon for the program you want to extract. It will then be unpacked on to your RAM disk, and you can drag it from there to wherever you want.

Programs marked with an* are for Workbench 2 and above only.



Amiga Real Time Monitor will tell you all of those dark secrets hiding in your Amiga's depths.

ARTM

ARTM is short for Amiga Real Time Monitor, which is a program designed to allow you to work out what is going on in the depths of your Amiga. It can show you what tasks are running, give you the versions of the libraries being used and a compendious range of other things. To use it, simply double click on the program Icon. You can access the different information screens within the program by clicking on any one of the buttons at the bottom of the screen. For more information, check the excellent documentation which accompanies the program.



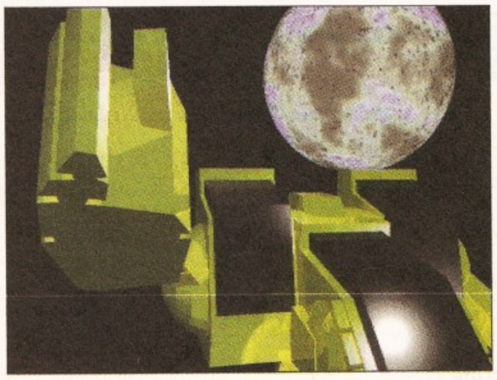
A selection of some of the attributes included on this month's Subscribers' disk.

ATTRIBUTES

This is a selection of attributes for use with the ray tracing program Imagine, as featured on the *Amiga Format* coverdisk of issue 53 (November 1993). These textures are taken from the CDPD IV CD-ROM (reviewed on page 24 of this issue), and can easily be applied to any *Imagine* object. To use them, simply select the object you want, select "Attributes", click on "load" and pick the texture you want to apply. The various values will be altered appropriately, and any textures will also be loaded. All of the attributes should work with either *Imagine 2* or *3*.

CLIP BOARD ENHANCER*

Clip Board Enhancer (CBE) is a handy little program which will, surprise, surprise, enhance your clipboard. It will allow you to use the 256 different clipboards which the Amiga supports, although most programs only support one. Each of these can hold a separate item, which can be anything from a text file to a graphic file. You can then move things between the various buffers and cut to, or paste from any of them simply by selecting the appropriate buffer.



This fearsome-looking Robot could be yours if you subscribe (as long as you've got Imagine too)!

CHOPPER

Chopper is a simple program which will take a large file and chop it into several smaller ones. While this sounds like a rather bizarre thing to do, it could be extremely useful if you are trying to copy a large file from one computer to another. You can chop up the file, put it on to several disks and then combine them back together to form the large file again. In order to facilitate transfers between Amigas and PCs, there is also a PC version of the program.

FONTS

Also included on this month's disk are eight Compugraphic fonts, which can be used with Workbench or any program which supports them (such as *Wordworth*, *Final Writer*, *Deluxe Paint*, etcetera). To install the fonts you will need to use the Intellifont program (called Fountain on Workbench 2), which will install them on to your Workbench disk.

PROFESSIONAL FILE SYSTEM*

This is a completely new filing system which completely replaces the OFS and FFS which is included in Workbench. The author claims that this gives a two to three times increase in terms of writing speed and a 50 per cent increase in reading speed. See page 88 for further details of the sort of increase in access speed you can expect when using professional file system on floppy disks, although you should remember that the disks will only be readable if you have the new filing system installed.

ROBOT

Robot is a rather mean-looking *Imagine* object which can be loaded into any version of the 3D raytracing program. It has been extremely well designed, as it allows you to move any of the arms or legs independently without having to set up any bones. So, creating an animation of the robot walking, smashing buildings, playing chess or picking up a small cat in a loving sort of way would be extremely easy using the forms editor.

SNOOPLIBS

Snooplibs is a program which allows you to patch any running library. As such, it's really only for use by those that understand the intricacies of libraries, as you could potentially do some damage by using it without really understanding what you are doing. If you are a serious Amiga programmer, then SnoopLibs could be an extremely useful

IF IT GOES HORRIBLY WRONG...

If you encounter any problems after following the instructions on this page, please write in with details of your hardware and software setup. Address your queries to:

Graeme Sandiford
c/o *Amiga Shopper*
Future Publishing
30 Monmouth Street
Bath BA1 2BW

product, as it enables you to directly observe how a library is behaving, by producing a list of the library calls and operations carried out.

FINAL WRAPPER

This is a series of *Final Writer* Macros which do weird things with text, including wrapping text around ovals and producing spiral text. There are also a variety of other ARexx macros included to do things such as centring, stretching or expanding objects. As you have probably guessed, these macros will only work with the word processor *Final Writer*, although they do also serve as a good example of how to efficiently use ARexx to control a program.

WBLOCK*

This program allows you to lock your workbench with a password. When executed, it will blank the screen so nobody can use your machine. When you want to get back on to the machine, you simply type in your password, and the workbench reappears. Simple, eh?

Some of the more knowledgeable among you may have realised that you could get around it by switching over to another screen, but WbLock deals with this as well. It makes the mouse somewhat difficult to use, as it jumps around the screen in a distinctly random fashion. Completely secure? No, but it will stop a casual snooper doing anything nasty to your machine. However, it can be circumvented, and it won't stop somebody picking up your machine and walking off with it.

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AmigaDOS

Are you still clinging on to the past? There's never been a better time to let bygones be bygones, as Mark Smiddy explains.

As regular readers will be aware, I'm very fond of flying the Commodore flag and nostalgic as I may be, I'm also a great fan of progress. Change, like the passage of time, is inevitable. Holding on to the past may be comfortable but there comes a time when moving on is the only option. As I see it, there are two reasons to retain Kickstart 1.2 or 1.3 compatibility in an older Amiga:

1. Cost. The most resilient reason not to change is the weight of your wallet [hey, look, the moths are flying away with mine]. No one likes spending money unless they have to and, no, I'm not suggesting you rush out and buy a new machine. Technology is highly sensitive to the rigours of time and software is no exception; (comparably resilient as they are, even I have to change my slippers once in a while).

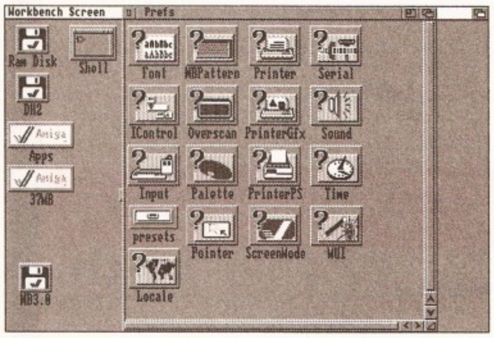
2. Compatibility. Richard Hooker, writing in the preface to a 17th century dictionary, notes the following: "Change is not made without inconvenience, even from worse to better." Hanging on to the past while progress makes its interminable voyage, causes the compatible of yesterday become the incompatible of tomorrow. The same, it seems, applies to my slippers.

While poeticism may not convince you (it's a good excuse to give our new Editor an early ulcer) some facts should. Some of the following information is subjective and still a matter for heated debate among those entrenched on either side of the argument. In order that this situation is not made worse I will make the following golden rules:

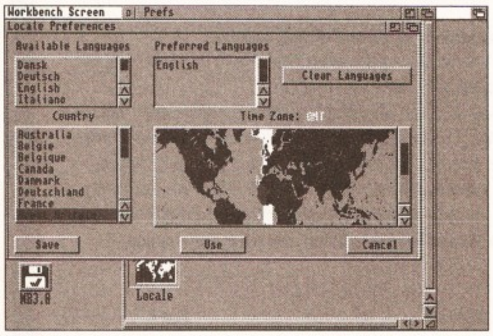
1. Programs written for 1.3 machines will, in general, run perceptibly faster on later models.

2. AmigaDOS 3 is better than AmigaDOS 2; earlier versions are Neanderthal in comparison and would not normally deserve further mention.

Quantifying golden rule 1 is tricky. It's difficult to attach a figure to, since speed improvements primarily affect the graphics routines. However, because this includes Intuition, it follows that Workbench and applications, will also feel faster. Perception of speed is a strange thing: age and occupation affect each individual's perception of time; and time is a measure of rate of change. Speed is defined here as the amount of work that can be done in a specific time frame; rather than a velocity which is a ratio distance travelled over time. See Panel "Colour Me Friendly" for a speculative discussion on the implications of time perception.



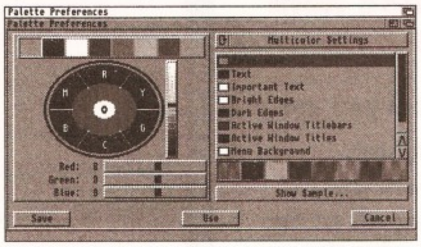
Can changing your screen colours affect how fast Workbench runs? Can different colours make it easier to use? See "Colour me Friendly".



"Locale" controls where you are and how the machine behaves even at AmigaDOS level!

Defending Rule 2 is what the remainder of this article is about and by the end, everyone should be reaching for the cheque books. Let's start with a fairly simple premise, more to do with Workbench than AmigaDOS: but what holds true for one must also hold for the other.

The introduction of Workbench 2 came at the ROM level. There's a lot of controversy surrounding this so I would like to make the position totally clear for those of you who still think that an operating system comes on a disk. It's true that Kickstart can be loaded on a disk and it's also true that it can be forced to run from RAM, assuming you have the odd half-meg to spare. (Interestingly, through a bizarre piece of computer architectural pathology, it even runs slightly faster from RAM, too.)



Workbench 3 supports many more than the simplistic fours colours of the early machines. This is an ECS (pre-A1200) Amiga with 16 colours sporting the extended palette requester.

However, unless you happen to be a registered developer or the proud owner of an early A3000, you will not have been able to obtain a legitimate copy of the Workbench 2-compatible Kickstart on disk. The same applies to Workbench 3, which has an annoying "magic patch" to remind even legitimate users of this every time they switch on the machine. Soft-booting the operating system after every cold boot is a pain even with a hard disk and not recommended for older machines.

The bits that are generally accepted as being Workbench, (the bits on disk) comprise those parts of the operating system that were either not ready to go into ROM; were not needed by the ROM (extra libraries); or too volatile to be permanently made part of the system software patches, user preferences and so on.

Preferences are a particularly contentious issue, because until the arrival of Workbench 2 (hitherto known as AmigaDOS 1.4), the preferences had been stored in a single (extensible) structure and were operated using a single tool. Workbench 2, while maintaining compatibility with the original, threw the whole lot away and started from scratch. This was greeted by users with open arms and mutterings from several nameless developers who had come to rely on the contents of that structure. (Yes folks, I was one of those muttering at the back. Far be it from me to make allegations without having at least one culprit to recursively point the finger at.)

The really major visible change from Workbench 1.3 got a half-hearted attach years before when 1.3 itself appeared: resident AmigaDOS commands. Resident commands speed up the operation of common tasks by pre-loading the command's code into memory (RAM) and executing it many times. BCPL doesn't lend itself very well to pure code (necessary for residency) so only a small selection of the available commands were re-coded in C (which does) thus speeding common operations.

BETTER RESIDENTS

Workbench 2 appeared with many of the common AmigaDOS commands loaded in ROM. I've already mentioned that ROM code runs slightly slower than code in RAM, but the difference is very slight. Moreover, two things affect the ROM/RAM resident argument: available memory and average speed. Memory is easy to see: each resident command consumes its full disk size in user RAM. Sharp-eyed readers might have noticed I mention disk size as opposed to code size: there is a difference. AmigaDOS programs are made up of several segments essentially the actual program "executable" and separate loader information created by the Linker. The loader "overhead" varies according to the type of program and even what it was compiled/assembled with. As an extreme example, I have a very simple four byte program to force a WARN condition but its loader overhead is no less than 36 bytes! Or put another way, almost 90 per cent of that code is loader information. (The same program written in ANSI C would be even longer because C has a more complex code preamble). Because resident code contains the loader information too, it consumes the program's physical size in memory.

Just to make things more complex, you also have to think in terms of static and dynamic RAM allocation. A static allocation is made by the loader when the program is copied from disk to RAM. Such an allocation is fixed and you can determine how extensive it is using AVAIL. Dynamic allocations are in constant flux: changing while the program runs. Some dynamic allocations (such as local variable storage) are made from the Shell's stack: currently 4000 bytes by default. Programs such as COPY dynamically allocate memory from the free pool while they run so the actual

consumption at any time is impossible to calculate. FMU a third-party file copier, written by yours truly, allocates memory from the free pool as required and can consume just about every free byte in a matter of seconds.

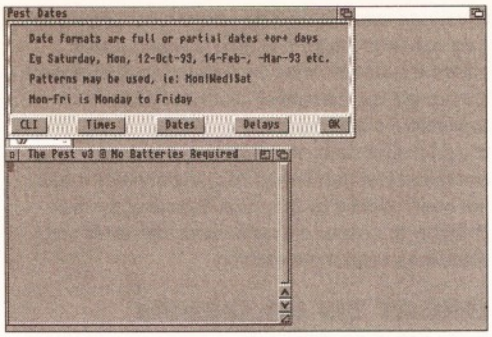
Pre-loading a command into memory for later use is inconveniently slow since it involves a disk access (disks are typically 100 to 1000 times slower than RAM). The overall speed increase given by a RAM resident command accessed in this way must logically take the loading phase into account, so no overall performance improvement would be visible until the command had been used many hundreds of times. You can think of this as the ROM-resident command as having a massive head-start (equivalent to the disk loading time plus the time required to load RESIDENT and execute itself).

SWIFTLY MOVING ON

Just from that brief analysis you should be able to see the great leap forward represented by Workbench 2. Not all AmigaDOS commands were include in the ROM because there simply wasn't the room. But it doesn't end there: AmigaDOS 2 represented a great leap forward in use ability.

At long last the command-line parser became accessible to the programming public: previously it had been hidden away in the mysterious BCPL global vector table; uniquely available to puckka AmigaDOS programs. A side effect was some dreadful C constructs for commands like FORMAT and DISKCOPY which had no connection with the accepted AmigaDOS syntax. It's probably worth mentioning here that these commands were not written in BCPL: but in C. This also accounts for their placement in the System drawer (rather than the C directory, the more logical position).

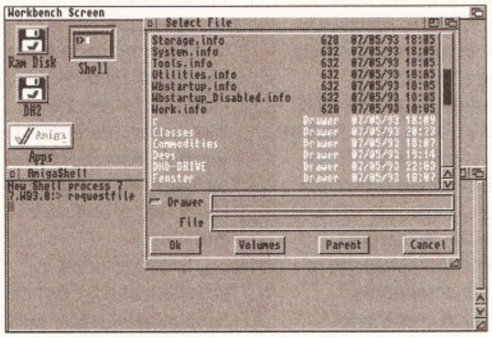
The argument over what makes a good command parser is likely to rage for some time, but in my opinion, AmigaDOS has one of the best around. Even the early versions were more logical



The Pest v3, shown previously in Amiga Shopper, shows what you can do with simple requesters!

than the existing systems such as CP/M, MS-DOS and Unix. The reason early parsers were so clumsy was for ease of programming and simplicity. A restriction partly caused by the poor speed of those early 8-bit processors and mostly by limited ROM space. I suspect there was an underling psychological problem here; programmers tended to set themselves apart from the intellectually inferior proletariat by making things deliberately tricky.

Commercial pressures were forcing manufacturers to make computers more accessible, so GUI interfaces (pioneered at Xerox PARC) became as cliched as mother-in-law jokes. Even so, there was still an undercurrent of users who preferred the speed, power and versatility of command-line interfaces. The main argument arises in that it is not possible to effectively program an automated series of decisions via a windowed front end. So CLIs remained, as they still do today: albeit in a much modified form.



Another addtion for AmigaDOS 3 is this extremely useful file requester: available in Workbench 2 under normal software control.

From a programmer's point of view, parsing (splitting up) a command line into its arguments is a nightmare. For this reason several methods have been proposed, each with varying degrees of success. CP/M and later MS-DOS use a system of "switches" separated from the command and text arguments (such as filenames) by a backslash "\". Most of these are a single letter, for instance:

```
A:DIR \W
```

but more complex constructs can use an extension such as:

```
A:FORMAT A: \F:720
```

which forces a 1.44Mb disk drive to format a disk to 720K. Unix has a similar system which (as is typical of that advanced system) is more extensible. Unix command switches are separated from the rest of the command line with a dash, "-", and a typical command line might read like this:

```
FMU somefile -ras-Ar-Taty2
```

Don't try that one at home, it won't work. Unix has another oddity a hangover from the limited filenames of the machines it originated from most command names are four letters or less! For example: GREP (a powerful search) and LS (akin to the AmigaDOS, LIST). Since most Amiga programmers used C to interface with the operating system (a logical choice, since the remainder of Kickstart was written in C) there was a tendency toward using

COLOUR ME FRIENDLY

Curiously, we perceive time as being a variable: hence the expression "time flies when you're having fun". This affect can be extended to encompass Workbench 2 (you're going to like this). Workbench 2 is generally regarded as being more pleasant to work with (neutral greys are less stressful than bright blue, white and orange) so time spent using it is enjoyable.

You can try this at home for yourself by attempting to guess some finite passage of time while looking at different images or even coloured card. Get someone with a stopwatch to time you and see how accurately you can guess the passage of time. A minute is sufficient, longer intervals become tiresome and colour the result (if you'll excuse the gratuitous pun).

In case you haven't already guessed, this has very interesting consequences for all Workbench versions. Specifically, by adjusting the palette for Workbench 1.3 to be the neutral grey associated with Workbench 2, it will "seem" to work faster. Although this perceptive effect has no real affect on the machine, the effect on users is staggering. Unfortunately, the person making the adjustment will (in all likelihood) claim not notice the apparent increase.

This is caused by what's termed "negative feedback" [blast, there goes another one]. Understanding the mechanism makes it seem less believable; and (more pertinently) it sounds like an April fool. Performing the experiment described earlier on your family and friends should be enough to convince you the mechanism is quite real and demonstrable. The effect varies from person to person though.

So what about Workbench 2+? It follows that any measurable quantity when combined with another of the same polarity will generate a result equal to the sum of the magnitudes. (That's a fancy way of saying 1+1=2) Throwing perception into the sum bails out normal rules through a process known as "positive feedback"; chaos theory enters the equation at about this time and things get really hairy.

The theory applied to Workbench 2 goes something like this. Three identifiable mechanisms are in progress: it looks better; the colours are nicer (perceptual effects) and the code improvements make it run faster (a physical effect). The latter is pleasant in itself and thus re-enforces the former two.

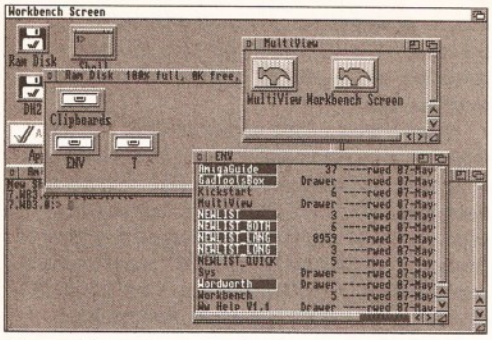
Now for the mind-bending loop. Such an effect due to perception, is not linear, but circular. Each affect perceptually enforces the other in a circular fashion (part of the result of the sum is added to the sum). Clearly, it isn't possible for this to continue indefinitely: to do so would be akin to time passing at infinite speed and the additive affect degenerates very rapidly over several iterations of the perceptive feedback loop. The net result of this is that Workbench 2 "feels" a lot faster than it really is.

It might seem like a cheat, but since it is operating at a basic psychological level, it's just as real if you fitted a real accelerator. Interestingly, this can be used with hilarious consequences. I know of several, intelligent people who (sincerely) believe their cars "go" better after being washed.

You can try this on a friend by telling them you have fitted a new accelerator to your machine and asking them how much faster it feels. Now put your hand under the machine (feigning flipping a switch) to switch the "accelerator" off and ask them to take a guess at the speed increase. This auto-suggestion can be improved by moving the mouse faster in "accelerated" mode.

It's important that your "guinea pig" is receptive to practical jokes and preferably that they don't have sufficient knowledge to recognise the rouse.

(The author and publisher do not accept responsibility for physical harm caused as a result of these experiments.)

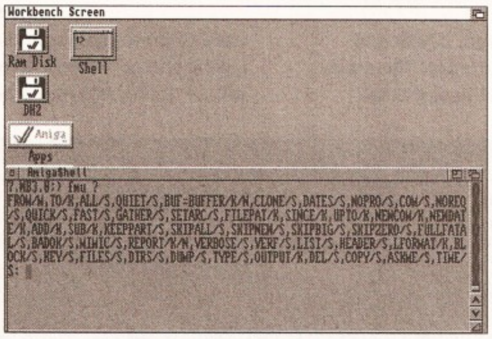


No need to get your hands dirty Workbench 2 allows access to private Workbench only files and applications with ease!

these ugly constructs in many CLI utilities. You can still see it in PD and shareware programs written in Lattice C, such as, for example, LHA (a Huffman encoding archiver).

Not everyone thought that way of course, and the MicroSmiths (Charlie Heath and co.) made it there purpose in life to invent ARP the AmigaDOS replacement project. The ARP library is still widely used by programmers wishing to retain 1.3 compatibility, but there is a tendency to abandon 1.3 altogether, because frankly, it's a pain. Part of ARP lives on in AmigaDOS 2 as the standard file requesters, but only some of it's other proposals were adopted by Commodore's software engineers.

One of ARP's major strengths is the GADS function. This allowed programmers access to a decent CLI parser even in a 1.3 compatible application. GADS was not a hook into the BCPL AmigaDOS vector, but a complete function in its own right. At last it was possible to access a simple command line that took account of user's needs: by making things obvious.



FMU the File Management Utility was made possible by extended features found in AmigaDOS 2 and higher; this is the verbose mode.

Love or hate it, the AmigaDOS CLI interface is logical and easy to follow. You don't need to remember hundreds of weird single letter switches and weird combinations of upper and lower case letters. You just ask the command for some help and it displays the template. In many cases, one or two readings of a good manual are sufficient to familiarise yourself with what it all means. When an AmigaDOS programmer wants to include a switch to do something he can just include a word that suggests what the function does. Extensions such as keywords with arguments are just an extension of that. For example:

```
TYPE Filename HEX
```

Is quite sufficient to suggest that the name file will be listed in hex-dump format. A similar instance, in Unix let's say might read:

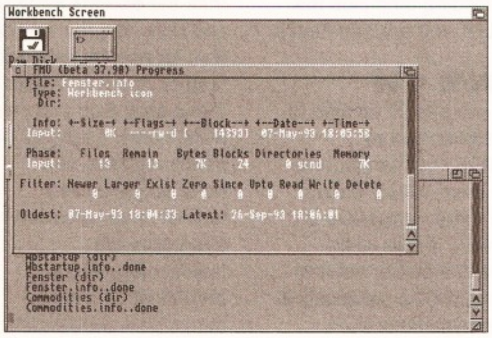
```
TYPE filename -X
```

Doesn't look too bad, until you try it with a lower case "X" in which case the command could complain, or, as is often the case, do something completely different! These are contrived examples, and even Unix isn't that bad but this illustrates the point. Moreover, if you forget the syntax of a command, AmigaDOS has always had the ability to help.

When AmigaDOS 2 was being developed, the ARP team suggested that it might be a good idea to include some extra help with the command: as they had with GADS. The idea is that if a user enters a question mark as a commands argument it spits out its "template". Further help is then available if a second query is entered at this stage. It's a point of note, that although the new command line parser has this functionality it has not been utilised by the main operating system: probably to conserve space, since the extra text consumes even more memory.

GREAT TO BE GREEN

At the risk of sounding trite, a major advancement first appearing in AmigaDOS 2 were environmental variables. Alright, I know the system first made its appearance in AmigaDOS 1.3, but that was little more than a last-minute patch. From AmigaDOS 2, variables are almost as easy to use as they are in early BASICs.



FMU shows off its help template there's over 40 options and hundreds of possibilities to experiment with many made direct accessible from AmigaDOS 2.

The typeless implementation is more like ARexx (also featured from AmigaDOS 2) but this makes life easier for the poor user; confused by bytes, ints, strings, longs, aptrs and so it goes on.

Environmental variables can be included in calculations and tests just as easily as they are included in command strings. Even at AmigaDOS 3, variables are not perfect, but as DOS systems go, they must rate amongst the best: let's not forget, this is device management system: not a programming language.

On the subject of programming, it's worth mentioning that ARexx replaces AmigaBASIC for Workbench 2: a decision that uniformed observers greeted with surprise and disdain. It's a point of fact, that at the time, ARexx was more the preserve of our American cousins, the conservative Brit, being more at home with more traditional BASIC. This habit, no doubt, brought about by the profusion of micros with native BASIC in the micro-explosion of the 1980s, caused a die-hard attitude. The Americans are classically more receptive to change and regarded ARexx inclusion as a major improvement.

ARexx is the only language specifically developed for the Amiga, although its roots lie in a fringe language developed for IBM mainframes. Bill Hawes' implementation harnesses the Amiga's unique abilities like no BASIC ever could. A small resident program (the ARexx Master process) handles a powerful command set for programs written in simple ASCII text (unlike most interpreted languages, which use a special editor and a tokenising algorithm for added speed).

So no one is going to claim ARexx is fast, it isn't. But it has the unique ability (by design) to communicate with other programs and, in effect, control them remotely. Any application can provide an ARexx "port" thus allowing ARexx access to some or all of its functions. The success of this system has been varied; but currently one of the best examples is Gold Disk's infamous Professional Page which harnesses much of its ease of use via Genies: These are short Arexx programs which control Pro Page, carrying out a variety of tasks.

WHAT ABOUT WORKBENCH 3?

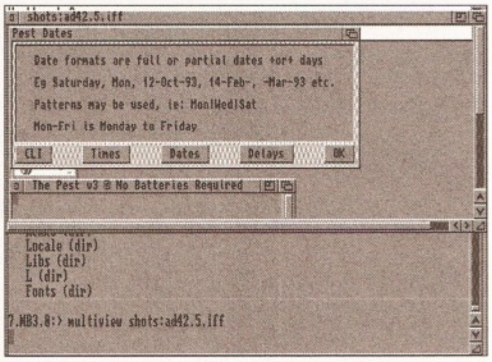
Indeed, what about it? Workbench 3 was really a natural development from Workbench 2.1 (that's where country localisation came in) and suggesting a major step like this is a trifle cheeky in my book. The real changes were less in AmigaDOS/Workbench suggesting a sub-revision number such as Workbench 2.2 and more in the machine's architecture. Few could have failed to have noticed all the hoo-har surrounding the major change in the custom chip set from ECS to AGA and the leap from 4096 colours to many thousands. Not to mention the base processor leap from 68000 to 68020.

The renaming of Workbench was probably to reflect this change, more than any major differences in the system itself. Workbench (and AmigaDOS) does feature some new capability: not least two user programmable option and file requesters available from AmigaDOS. Plus the inclusion of the underrated Multiview. Even so it was more of a gentle step than the gigantic leap from 1.3 to 2.0.

In summary, you must ask yourself why you are still battling with Kickstart 1.3 or earlier. Anything that doesn't run on the newer machines is bugged or badly programmed: so why are you using it anyway? In spite of all the negativity surrounding ECS/Workbench 2 and AGA/Workbench 3; Commodore retained a remarkable degree of compatibility provided developers followed published guidelines to the letter. Those that didn't, fell foul of the changes.

If you need a good example, look at Scribble: one of the very first Amiga applications, and the first third-party offering, it runs on an A4000 with Workbench 3 just as well as it runs on an A1000 with Kickstart 1.2. AS

Need I really say more?



Multiview (Workbench 3) is a powerful file viewer: shown here displaying a simple IFF file but it can be used to show GIF, JPEG and even Amiga hypertext applications.

AMOS Action

Simon Green continues his voyage of discovery through the turbulent sea that is the AMOS programming language, this month turning his (admittedly short lived) attention to sound and music

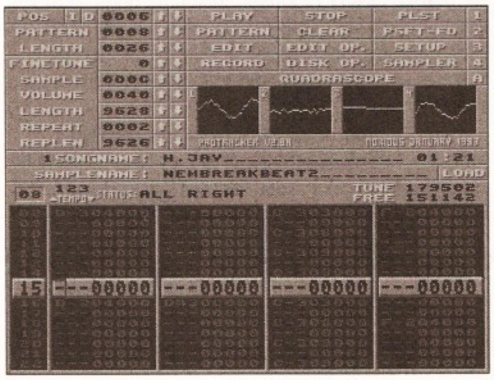
The sound capabilities of the Amiga have always been one of its strong points. Back in the days when the most the average PC could do was go"beep!", the Amiga amazed and stunned people with its four-channel stereo sound. At the time, the Amiga's ability to digitally record real sounds and play them back at high-quality was unheard of on home computers. Technology has, inevitably, moved forward a long way since then, with the advent of 16-bit sampling and General MIDI, but the Amiga still gives most PC "SoundBlaster"cards a very good run for their money.

AMOS, more than almost any other programming language on the Amiga,allows quick and easy access to all the Amiga's audio facilities. Using AMOS it takes very little effort to play sound samples, synthesised sound effects, and music. And as we shall see, it is even possible to use AMOS to control external musical instruments via a MIDI interface.

SOUND THOSE TRACKS

Before you can incorporate any audio features into your AMOS programs, you first need to create the necessary sound and music files. Fortunately, one of the great things about the Amiga is its vibrant public domain scene. There is huge amount of PD software available for the creation of music and sound effects.

Probably the Amiga's most significant contribution to music software is the "SoundTracker" music composition program. Almost every Amiga and PC game and demo you have ever seen probably had its music created on SoundTracker, or one of its variants. Originally a commercial product, SoundTracker was reverse engineered and re-created by a selection of crazy European coders, and now appears to be pretty much in the public domain. There are now a vast number of different versions, including: "NoiseTracker", "ProTracker", and more recently the rather more system-friendly "OctaMed", but they all offer broadly the same features.



ProTracker – the latest and greatest in a long line of SoundTracker programs, as used by the game music professionals.

SoundTracker was designed as a minimal music creation system, aimed at programmers rather than musicians (this is demonstrated by the fact that in early versions all the numeric read-outs were in hexadecimal). However,since its creation many new features have been added to make it more user-friendly. It it still often criticised as being difficult to use, but once you've got over its initially rather daunting numerical display, it is actually very straightforward.

The music created by SoundTracker programs is usually stored in a special file known as a "module" or simply "mod". Modules contain in a single file not only the patterns of notes that make up the tune, but also the sound samples for the instruments that actually make the sound. Soundtracker modules have almost become a standard file format. Soundtracker clones and module players are now available on almost every conceivable machine, including Atari STs, Archimedes, PCs, and even UNIX workstations.

BE CREATIVE

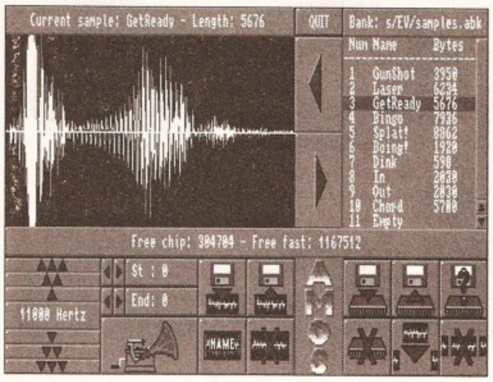
There are vast quantities of SoundTracker modules available in the public domain, but they are of very variable quality, to say the least. It's a lot more original and creative if you write your own music. Don't worry if you don't have any musical talent – you only have to listen the charts to realise that this is no barrier to success. If you can't come up with a decent melody, don't worry – just sample one (taking notice of the relevant copyright laws, obviously!). All you need is a bass line, a nice breakbeat and some ridiculous vocal samples.

Professional video game musicians will tell you that the function of their music is to add to the excitement and atmosphere of the game, but this is obviously not true. Remember that the prime function of all in-game music is to annoy the player as much as possible. To add to the frustration, make sure that there is no option to switch it off.

Fun though AMOS' built-in sound effects commands ("BOOM" and "SHOOT") are, there's no substitute for good sampled effects in your programs. There are plenty of sound sample disks available in the public domain, but if you are lucky enough to own a sound sampler, it's a lot more fun to record your own samples. I myself have had many hours of fun going round my house with a tape recorder, hitting various objects, dropping wet sponges into buckets, discharging high-velocity weapons, and throwing people off tall buildings, all

LISTING 1: CHANGING THE PITCH OF A SAMPLE WHILST IT'S PLAYING

```
' Sound sample effects
' Simon Green, 1994
'
If Ntsc
   CLOCKCONST=3579545 : Rem NTSC clock constant
Else
   CLOCKCONST=3546895 : Rem PAL clock constant
End If
'
Led Off : Rem Turn off low-pass filter
' Play sample 1 looped on channel 0
Sam Loop On
Sam Play %1,1
'
Curs Off
Limit Mouse
'
Repeat
   ' Get horizontal position of mouse
   MX#=X Screen(X Mouse)
   ' Calculate playback rate
   R=1000+27000*(MX#/(Screen Width-1))
   '
   Locate 0,0
   Print "Playback rate:";R;"       "
   '
   CHANGESPEED[0,R]
Until Mouse Key0
'
Sam Loop Off
End
'
Procedure CHANGESPEED[CHAN,RATE]
   Shared CLOCKCONST
   ' Change the playback rate of a channel
   ' CHAN - Audio channel (0 to 3)
   ' RATE - playback rate (samples per second)
   '
   If CHAN
```



The AMOS Professional sample bank maker program is thankfully a lot more reliable than the original AMOS version, but some of the icons are a bit weird...

just to obtain those hard-to-get sound effects.

Speech samples can also add considerably to your games. Don't worry if you don't actually have one of those deep "film trailer" type voices, just sample yourself speaking quickly in your normal voice, and then play it at half the speed!

SAMPLE EFFECTS

AMOS provides a useful selection of instructions for playing sound samples. But it's a little known fact that the Amiga hardware is also capable of changing the playback rate of a sample whilst it is still playing. By sliding the frequency up and down whilst a sample is being played, some really excellent arcade-style sound effects can be created. For example, if you are writing a driving game, you could just loop a sample of the engine noise, and alter its pitch as the player accelerates and decelerates. This produces a much better effect than re-triggering the sample each time you want to change the playback speed.

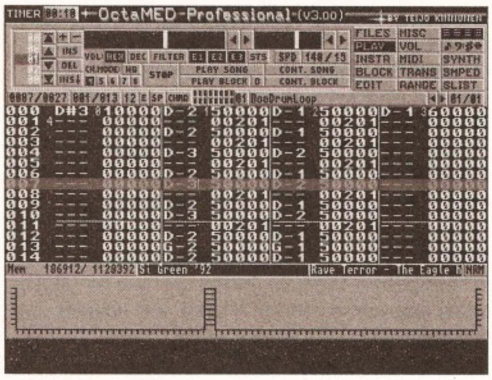
The way the program, given in listing 1, achieves this isn't entirely "legal", but it will work on any Amiga, and it's only for fun. To use the program you'll need a sample bank loaded. You can either create one yourself, using the sample bank maker, or load one of the demonstration ones from the AMOS example disks.

The program plays the first sample in the bank, looped so that it plays continuously. You can use the mouse to change the pitch of the sound (the horizontal position of the mouse determines the playback speed). When you've had enough, press the left mouse button to quit.

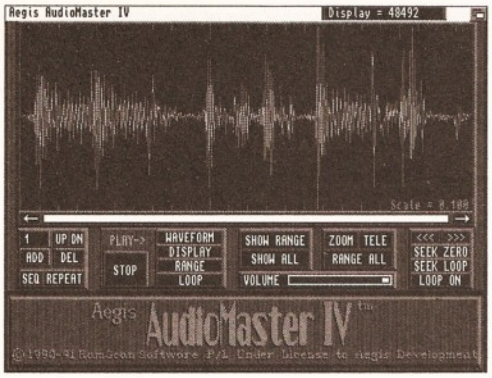
MUSIC IN AMOS

Confusingly, there are several different ways to play Soundtracker modules in AMOS. The first way is to use the original AMOS music system. To use this you first need to convert your module using the SoundTracker converter program supplied on the AMOS data disk, and save it out as an AMOS music bank. Once you've done this you can load the bank and play the music from your own programs. The AMOS music system is very flexible – you can play samples over the top, fade the volume of the music, change the tempo, and use the "vumeter" functions.

Unfortunately, the converter program is slightly unreliable. In my experience it tends to play modules at the slightly the wrong speed, and often messes up a lot of the effects and commands as well. There is also a converter program to convert scores from the old (but excellent) SONIX music



AMOS Professional has the ability to play music created in OctaMed.



The Enhanced Music Extension includes commands for recording sounds from a sound sampler, so you can throw away your copy of AudioMaster. Well, maybe.

program, but this is even less practical. Soundtracker technology moves very fast, and the AMOS music system is now very out of date. To make things worse, the Sound Tracker converter program doesn't even seem to be included with AMOS Professional!

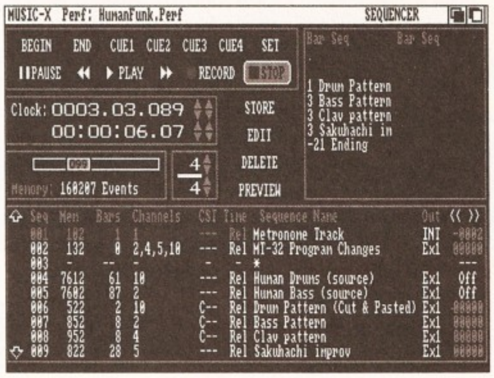
Thankfully, with version 1.34 of AMOS, a new music system was introduced in the form of the "TRACK LOAD" and "TRACK PLAY" commands. These were a vast improvement, and will happily play almost any SoundTracker module you care to throw at them. Unfortunately, the only facilities provided are to start and stop the music. It is not possible to play sound samples at the same time, or fade the music. This is a big problem, especially for in-game music.

AMOS Professional also provides commands for playing "MED"modules, including ones including MIDI information. These work well, but the MED music system has the same restrictions as the "TRACK PLAY" system,and still isn't as flexible as the original AMOS music system.

Fortunately, one of the great things about AMOS is its expandability. Francois Lionet had the foresight to make it easy for users to create their own extensions to the language. AMOS Extensions

LISTING 2: ACCESSING MIDI FROM AMOS

```
' MIDI from AMOS
' Simon Green, 1994
'
Screen Open 0,640,256,2,Hires
'
MIDIOPEN
' Change this to your favourite instrument:
PROGCHANGE[1,3]
'
' Play a nice scale of notes
For N=60 To 72
   Print "Note:";N
   _NOTEON[1,N,127]
   Wait 10
   _NOTEOFF[1,N,127]
   Wait 5
Next
'
' Play a simple chord
_NOTEON[1,60,127]
_NOTEON[2,64,127]
_NOTEON[3,67,127]
Wait 20
_NOTEON[1,60,0]
_NOTEON[2,64,0]
_NOTEON[3,67,0]
'
' Copy in to out (echo)
Repeat
   MIDIIN
   Print "Input:";Asc(Param$)
   MIDIOUT[Param$]
Until Inkey$""
'
MIDICLOSE
End
'
Procedure MIDIOPEN
   ' Set up serial port for MIDI
   ' Opens serial port as channel 0
   Serial Open 0,0
   Serial Fast 0
   Serial Speed 0,31250 : Rem  MIDI bps rate
   Serial Bits 0,8,1 : Rem  8 bits data, 1 ☛
stop bit
   Serial Parity 0,3 : Rem  No parity?
   Serial Buf 0,1024
End Proc
'
Procedure MIDICLOSE
   ' Close serial device
   Serial Close 0
End Proc
'
Procedure MIDIIN
   ' Get a byte from the serial port
   Repeat
      BYTE=Serial Get(0)
   Until BYTE-1
End Proc[Chr$(BYTE)]
'
Procedure MIDIOUT[M$]
   ' Send a string to serial port
   Serial Send 0,M$
   Repeat : Until Serial Check(0)
End Proc
'
Procedure _NOTEON[CHAN,_NOTE,VEL]
   ' Send a "note on" message
   ' CHAN  - MIDI channel no. (1 to 16)
   ' _NOTE - Note to play (60 = Middle C)
   ' VEL   - Velocity (volume, max=127)
   MIDIOUT[Chr$(144+CHAN-
1)+Chr$(_NOTE)+Chr$(VEL)]
End Proc
'
Procedure _NOTEOFF[CHAN,_NOTE,VEL]
   ' Send a "note off" message
   ' Parameters as above
   MIDIOUT[Chr$(128+CHAN-
1)+Chr$(_NOTE)+Chr$(VEL)]
End Proc
'
Procedure PROGCHANGE[CHAN,PROG]
   ' Send a "program change" message
   ' CHAN - MIDI channel no.
   ' PROG - Program (preset sound) to ☛
change to
   MIDIOUT[Chr$(192+CHAN-1)+Chr$(PROG)]
End Proc
```



Do you reckon you could write a MIDI sequencer to rival Music-X in AMOS? It's possible!

JARGON BUSTING

Sample – in this context, a digital recording of a real sound, which can be played back by the Amiga. To record your own samples, you need a simple piece of hardware known as a sound sampler.

MIDI – the Musical Instrument Digital Interface

are simply collections of routines, written in assembly language, that add new commands to the language. You can usually be sure that if there are any slight flaws in AMOS, and enough people want to see a solution to them, then eventually some talented young (or old) programmer will come along and write an extension that solves everyone's problems.

MIDI FROM AMOS

For those of you don't know, MIDI is the "Musical Instrument Digital Interface". It's a standard for connecting together electronic musical instruments such as synthesizers, drum machines and sequencers. Using MIDI, it is possible, for example, to use one keyboard play the sounds on another, or to use a computer to control an instrument remotely.

Although the hardware of MIDI is somewhat unusual, from a programming point of view it's nothing more than a simple serial protocol. MIDI operates at the unusually fast speed of 31250 bits per second, with 8 data bits, one stop bit and no parity. To use it from AMOS, all we need to do is use AMOS' useful serial commands to open the serial port with the correct settings, and then we can read and write bytes to the serial port as we please.

Accessing MIDI from AMOS offers many interesting possibilities, including writing your own MIDI sequencing software, MIDI effects processing programs (e.g. echo) or even a MIDI-to-light program that produces visual effects in response to MIDI input.

Although it is possible to access almost all the features of an instrument via MIDI, a description of all the possibilities would take much more space than I have available here. The program given in listing 2 is meant only to demonstrate the serial settings you need, and some of the things you can do via MIDI. It includes procedures for playing notes(_NOTEON and _NOTEOFF), changing instruments (PROGCHANGE), and reading input (MIDIIN). These are probably the functions you'll use the most, but if you're interested in finding out more about MIDI, I suggest getting a good book on the subject.

To use this program you'll need a MIDI interface for your Amiga and a MIDI instrument of some description. When you run the program, you should hear it playing a simple 12-note scale on your MIDI instrument, followed by a nice chord. It will then go into a loop, copying everything from MIDI IN to MIDI OUT, and displaying the input as it goes. Make sure that you have your instrument in "local off" mode at this point, otherwise you might get some strange MIDI feedback effects.

If you have trouble getting the program to work, check your MIDI setup is working properly by testing it with another piece of MIDI software. You might also need to change your preferences serial settings. AS

EME – THE ENHANCED MUSIC EXTENSION

Hot off the Internet, all the way from Australia, I bring you EME, the"Enhanced Music Extension". Written by Paul Reece, a student from Tasmania, EME claims to solve all the problems with the current AMOS music system, and add a few tricks of its own. It is a direct replacement for the original music extension, and retains all the functionality of the original, as well as adding a large number of new commands. The package comes with versions of the extension for both AMOS The Creator (v1.3x) and AMOS Professional (v1.12 or higher), and includes a small printed manual and AmigaGuide online documentation.

At the heart of EME is a complete ProTracker play routine, which supports all the new ProTracker commands (pitchbend, arpeggio etc.). It also incorporates a MED play routine, which makes it possible to play Med and OctaMed modules in AMOS The Creator.

EME offers so many new commands that is difficult to list all of them here. It's safe to say that everything you could ever possibly want to do with a SoundTracker module is available here. Let's start off with the basics. You can start and stop modules playing. You can also pause a playing module and then later continue it where it left off. You can loop individual patterns in a song, and control whether the whole song loops. You can turn individual tracks on and off, and play samples on the unused tracks.

This is perfect for combining sound effects and in-game music. There is even a master volume control that can be used to alter the volume of a playing module, which makes it very easy to do fades.

The extension includes functions that return the current position in the song and pattern. This could be very useful for synchronising events in a program (for example, a music demo), with its soundtrack. EME also offers an interesting facility whereby you insert special trigger commands in the module itself, which can pass values to your program when they occur. Apparently this is the method used in demos such as "Jesus on E's"to trigger the visuals.

EME also provides functions that return the currently playing instrument on a channel and its period. Strangely, there is no matching function to return the volume of the currently playing instrument on a channel, which makes it difficult to do proper "vu-meter" type effects. It is also possible to obtain information on the module itself, including the name and type of the module, and the names and parameters of all the instruments it uses. There are even commands to play the individual instruments from a module. Phew.

As well as playing ProTracker modules, EME also has a selection of new commands for controlling the playback of sound samples. It includes a function to see whether a sample is still playing on a channel, which can be very handy. It also allows you to control sample looping on individual channels. This means that you can have a sample looping on one channel, but still play ordinary, unlooped samples on the remaining channels. There is also a facility that allows you to change the speed of a sample whilst it is playing.

One of the more innovative features of the extension is its sample priority system. This allows you to assign a priority value to each sample that you play. If you attempt to play a sample with a lower priority than a sample that is already playing, the sample will refuse to play. You can use this so that, for example, the shooting sound in your game will always take precedence over less important background sounds.

I must admit that my favourite part of EME is its support for sound sampling. The extension provides commands for monitoring the input to a sound sampler, and actually sampling into memory, at any given sample rate. At last it is possible to actually sample sounds from within AMOS itself, without having to use a separate sampling program such as AudioMaster.

In conclusion, I was very impressed with EME. It does a very specialised job, but it does it well. If you are serious about the music and sound effects in your AMOS programs, EME is an essential purchase. My only criticisms are that I'd like to see an equivalent of the original AMOS"VUMETER" command, that returns the volume of the current playing note on a channel, for doing those cool "spectrum analyser" effects. It would also be nice if the extension supported modules that use CIA timing (this allows the tempo to be more accurately controlled and is used in an increasing number of modules). Paul says he's working on this for the next version.

If you have any queries, you can E-mail the author at the following address: **"eme@elysium.clare.tased .edu.au".**

WHERE TO GET IT

The extension is available for the very reasonable price of $14.95 (£8 approx) from: **Public Domain Plus PO Box 791 Hornsby, New South Wales, Australia. 2077.**

Note that the price is in Australian Dollars and the only method of payment outside Australia is by international money order in Australian Dollars (add $2–$3 for postage).

The extension is also available in the US: **PLAYFIELD! PO Box 450884 Sunrise FL 33345-0884 (305) 846-7969 E-mail: rscott@gate.net**

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WE WILL MATCH OR BEAT ANY A4000 PRICE

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80		939		1539	1929	
120/130		969		1589	-	
214		989		1629	1979 IDE	
240/260		1019		-	-	
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PRICE CHANGES TELEPHONE FOR INFO

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A1200

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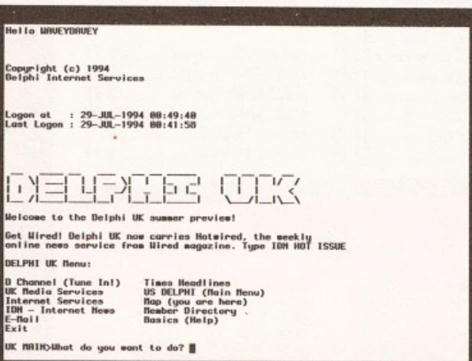
D-DAY

D-Day's here – that's D for Delphi. This month "Wavey" Davey Winder will be donning a pair of glasses and a seriously happy haircut to bring you the latest news from cyberspace.

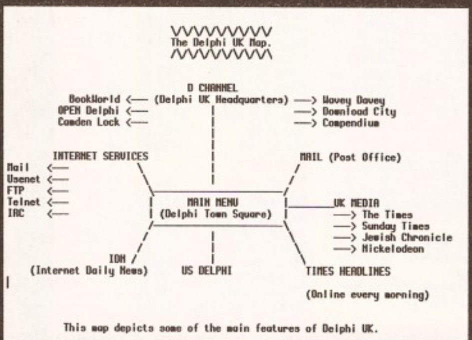
It would seem to be something of a boom time for the online business right now, everyone is talking about the information superhighway, the Internet, and wanting a slice of the action. Rupert Murdoch (the man who owns The Sun, The Times, Sky TV, The Royal Family, etc) doesn't strike me as the sort of man to ignore a blossoming new market when one slaps him across the forehead, and it would appear that my instincts are correct.

Murdoch's company News Corp purchased one of the biggest of the American online systems, Delphi, a while ago. Now Delphi has arrived in the UK with plans to become one of the largest British online systems as well.

Delphi Internet has been a success Stateside, attracting somewhere in the region of 100,000 members. Delphi UK opened for a "Summer Preview" in July, with the main launch being planned for September. Things are fairly quiet as I write this column, but then the system has only been up and running for a couple of weeks. As more and more people come to realise what is on offer at Delphi, things are bound to pick up. Online systems like this rely on the momentum that comes with a steady influx of new members.



The Delphi UK welcome menu. Delphi online system was recently purchased by Murdoch's News Corporation who has big plans for it.



A map showing you what's what on Delphi. The main launch of Delphi is planned for September.

SAMARITANS ONLINE

The Samaritans have gone and joined the electronic age, and you can now email your problems to them. All their volunteers have been fully trained in using email to communicate with people seeking help, and all contact will be in strict confidence. The email address is samaritans@cix.compulink.co.uk

If you don't want them to know your email address, then you can get in touch completely anonymously by sending email to an111848@anon.penet.fi where it will be forwarded to them automatically, all replies will be forwarded this way as well for a totally anonymous service.

WHAT'S ON OFFER?

Delphi seems to me to be something of a cross between what you get at Cix, conferencing and internet access, and CompuServe's serving of information retrieval and online news. Considering who owns Delphi it isn't at all surprising that you will find online news headlines from The Times, The Sunday Times, and Sky TV, as well as The Jewish Chronicle and from children's TV "Nickleodeon". The publishers HarperCollins have an online bookshop, and 20th Century Fox films have an area where you can download images and video from previews of their latest film releases. There are, of course, file download areas although these are not particularly stuffed full of goodies as of yet!

I have to say that Cix and CompuServe score highly because of their neat user interfaces, well they do if you are using an Off Line Reader. These programs give an otherwise rather unfriendly interface a very friendly and intuitive face lift. Not so with Delphi I'm afraid, the front end is clunky and tedious, and the editor you have to use really is abysmal (it makes Ed look like *PageStream*!). This is being addressed though, with a leading development company writing an Off Line Reader to give Delphi a more attractive public face.

One area that might just be of interest to regular readers of this column is the "WaveyDavey" section. This area is where you can pop in and join Wavey's Tea Party for a very informal, and sometimes totally teapot, conversation. Dear Wavey offers a not too serious online agony aunt, and access to a special selection of Wavey's favourite Gophers and Usenet Newsgroups.

Something that Delphi is very good at is its Internet access. It makes it just so easy, even a dead baboon could use it (well, OK, maybe not a dead one). You can get instant access to Gophers, Telnet sites, and Usenet Newsgroups from simple menus within most areas on Delphi. Whoever runs the area, known as a Wizard (Hey, that makes me Wizard Wavey!), can set up a menu containing entries pointing towards specific sites.

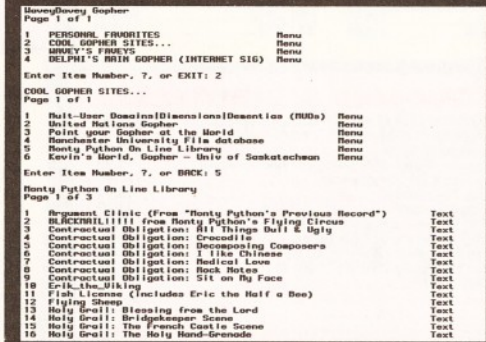


Special announcement: The BBC are on-line at long last – see overleaf for details...

In the WaveyDavey area, for example, there are menus that lead you to humorous and useful gopher sites, or you could telnet to a MUD site, or join a Usenet newsgroup of the distinctly batty variety. All of this is accomplished just by choosing a menu item and entering that number, you will then be whisked painlessly away to your chosen destination. If this happens to be a Usenet group you will even find yourself in a friendly newsreader program ready to read and reply to postings. As far as I am concerned this is one of the two biggest assets that Delphi UK has at the moment. The other one is Delphi in the United States.



Wavey Davey gets everywhere in Cyberspace! This is Wavey's own area of Delphi.



Wavey's favourite Gophers are easy peasy lemon squeezy the Delphi way. You can get instant access from simple menus on Delphi.

EVERYBODY'S GONE SURFIN', SURFIN' USA!

By joining Delphi UK you are actually getting two services for the price of one, because you get to use the US Delphi as well. This is actually a pretty good deal, as Delphi US has been around for a while now and has a userbase of more than 100,000 people. There is plenty to do in the States as you would expect, everything from an online version of the Grolier Encyclopedia, to an online recipe book, games, airline information, news, shopping and lots more. There are lots of special interest groups (SIGs), including a very lively Amiga one, to keep your discussion glands active. A couple of new additions I spotted recently included the official Rolling Stones area, where you can get details of the latest tour and order all the

new merchandising stuff [Hooray! – Ed], and the online version of "TV Nation" which you may have seen on Channel 4 recently. The TV programme is a rather offbeat look at life, presented by Michael Moore. Now you can chat with Michael Moore online and leave feedback for the show, some of which I understand is being used already in the current USA series.

HOW DO I JOIN, AND HOW MUCH WILL IT COST?

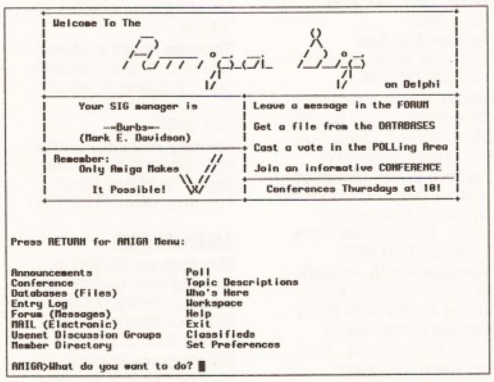
Delphi UK has two pricing plans, the 10/4 and the 20/20. If you opt for the 10/4 plan you pay ú10 a month and get four hours a month included in that cost, extra hours then cost £4 each. The 20/20 plan costs £20 a month but gives you 20 hours free, with extra time being charged at a rate of £1.80 per hour.

However, if you telephone ☎ 071 757 7150 and ask for details of the "Five Hours Free" offer, you will be able to try Delphi UK out for absolutely nothing. Yep, you can get 5 hours on the system just for the cost of your phone call, and with no obligation to join at the end of that time if you don't want to. Just make sure that you mention it was Wavey Davey and *Amiga Shopper* who sent you along.

SHOP, SHOP, SHOPPING!

Following in the great tradition of CompuServe, and not one to be left in the slow lane of the Information Superhighway, Cix is going to become part of the online shopping revolution. Currently still in its testing phase, you will soon be able to GO SHOPPING and enter the shopping subsystem on Cix. Here you will find shops instead of conferences, covering many different types of goods although it will be a safe bet that computer hardware, software, and books will feature pretty heavily! Just as if you were wandering along the local busy high street, so you will be able to browse through the shops on Cix.

If you find something you want to purchase you will be able to do so by credit card, cheque, or maybe even by having the cost of the goods added to your Cix bill. Payment methods will depend on what the owner of the shop will accept. It is hoped that shareware registration will be available using the shopping system, you pay for your registration and then can immediately download the registered version of the program. The same could also apply to full blown commercial software, available for download as soon as you pay your money!



A very healthy Amiga area exists if you hop over the ocean to the Stateside Delphi System.

Obviously this type of system costs money to implement, and someone somewhere along the line is going to have to help shoulder that cost. At the time of writing, Cix management have not decided if this will be the owner of the shop or the person doing the shopping. One thing's for sure, Cix is helping to bring a whole new meaning to "indoor shopping arcade".

VIRUSBUSTINGTASTIC NEWS, MATE!

Safe Hex International, the organisation that helps to combat computer viruses and boasts some of the world's leading anti-virus programmers as members, has released a unique virus killer that is designed specifically for Bulletin Board use. Xtruder will unarchive uploaded files as they are uploaded and check for any known viruses, it doesn't matter what "cruncher" has been used to pack the file. SHI hope that, if all BBSs implement the Xtruder system, viruses will eventually disappear from BBSs and thus remove the main distribution channel for their scumbag authors.

In fact, Safe Hex International are so impressed with this program that this years SHI Programmers Prize ($500 no less) has been awarded to Xtruder programmer Martin Wulffeld.

Any Sysops who's dying to find out more about Xtruder, which will be a shareware product, should contact:

UK Regional Virus Centre ☎ 0274 779212 AS

THE BBC GET CONNECTED, AT LAST!

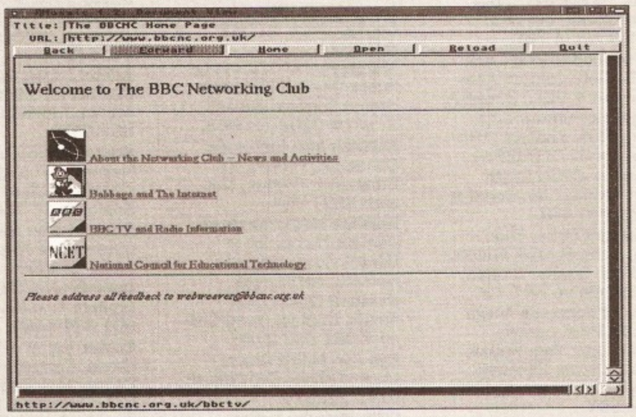
After many months of delay, the BBC Networking Club has finally arrived online. The BBCNC are looking to join the growing ranks of Internet Service providers in the UK, and for a registration fee of £25 plus a monthly charge of £12 (all costs plus VAT of course) you can get access to the Internet, plus the BBC's BBS "Auntie". For those people already Internet connected the Auntie BBS will cost £5 per month, which is a little bit expensive for what is a very simple BBS and min-conferencing system in my opinion (hopefully the BBS side of things will grow as the whole system develops).

Your registration fee includes a "starter pack" which comes complete with a specially written graphical front end for the system, well it does if you are an Acorn, PC, or Mac user. Hmmm, I wonder why there's no Amiga software – maybe the fact that the BBCNC is sponsored by BBC Education explains the support for Acorn! Come on BBC, this isn't good enough and I think you know it (I think I should have sent that to Esther Rantzen). I'm informed that they are "examining the possibilities" for Amiga software.

Fear not though, if you have an Internet connection you can access the BBC Networking Club World Wide Web pages which are really rather good. They include details of what's on the television and radio, feedback about programmes, and special announcements from the BBC. Using a browser like Mosaic is your best bet as you get all the pretty pictures that way, but a character based browser as accessible from Cix or Delphi will also do the trick.

Here are all the details you will need to find out what the BBC have to offer you:

Telephone ☎ 081 576 7799
Email info@bbcnc.org.uk
FTP ftp.bbcnc.org.uk
WWW http:/www.bbcnc.org.uk



After many months of delay, the BBC Networking Club has finally arrived online, Babbage included!

NEWSFLASH!

Literally just as I was putting the finishing touches to this month's Comms Column, I was given some news that is so amazing I just had to include it. Delphi UK have announced that they are to give their users the chance to win £1,000 each month, and you did read that right, £1,000 each month [Calm down Wavey – Ed].

The Delphi Treasure Hunt will run over the course of 4 weeks, and all you have to do is collect the 20 questions which will be released on a weekly basis and answer them correctly. All the answers will be found somewhere on Delphi UK, Delphi US, or by using Delphi's Internet gateway. A special hints forum will be available to help you on your way to that prize!

One lucky user each month will be drawn from the virtual hat – maybe even a real hat, who knows, and receive a prize of £1,000.

I've been involved with comms for a whole bag full of years now, and I've never heard of anything quite like this. If this is what it means when the likes of Rupert Murdoch go online, then I for one am all for it. Call Delphi UK on the same number as given before to get details of how to take part in the £1,000 Delphi Treasure Hunt.

BLITS & BOBS

Leader of the Liberal Democrats, Paddy Ashdown, can now be contacted by email as paddyashdown@cix.compulink.co.uk

If someone is desperate enough to write to him, I wouldn't expect a reply. He's a pretty busy guy – or so he claims.

Find your local group

Your at-a-glance guide to every Amiga user group in the world.

SOUTHEAST AND EAST

Addlestone 1–1 Amiga Club. Contact Peter Duckett ☎ 0932 855834 after 8pm.
Ashford Kent Youth Computer Group. Contact Jim Fanning ☎ 0233 629804.
Banstead Limited Edition Software. Contact Les, 28 Congcroft Avenue, Banstead, Surrey SM7 3AE.
Beccles Waveney Amiga (WAM). Contact Stephen Cockerell ☎ (0502) 711 888. 10 Hillcrest Close, Worlingham, Beccles, Suffolk NR34 7BY.
Brentwood Hermit Computer Club. Contact John Maynard ☎ 0277 218897.
Brighton Hanover Computer Club. Contact Colin Jones ☎ 0273 602834.
Bromley ICPUG South East. Contact Ien Beard ☎ 0689 830 934.
Bromtard Better Than Life. Contact Mark Waters, 7 Linton Downs, Brotard, Herefordshire HR7 4QT.
Bury St Edmunds Amiga Sports Fans. contact Jamie Last, York House, Church Road, Elmswell, Bury St Edmunds, Suffolk, IP30 9DY.
Camberley Camberley User Group. Contact F Wellbelove ☎ 0252 871545.
Cambridge Cambridge Sixty-Eight Group (CASE). Contact EPL Rowell ☎ 0954 210692.
Chesham Beaconsfield and District CC. Contact Philip Lishman ☎ 0494 782 298.
Clacton Cheapo PD Club. Contact Jason Meachen, Ivy Cottage, Chapel Road, Beaumont, Clacton, Essex CO16 0AR.
Coulsdon The Crumblies. Contact Frank Barron ☎ 081 668 7695
Enfield Enfield Amiga Club. Contact Sean Clifton ☎ 081 8042867
Folkestone Amiga 101. Contact D Cryer ☎ 0303 245 378.
Gerrards Cross Chic Computer Club. Contact Steve Winter ☎ 0753 884473.
Hastings Computer Club. Contact ☎ 0424 421480.
Horsham Amiga Zone. Contact Gareth and Raymond, 7 Swindon Road, Horsham, W. Sussex RH12 2HE.
Ipswich MicroAcid. David Charman 0473 626226. 85 Carlford Close, Martlesham Heath, Ipswich, Suffolk, IP5 7TA.
Ipswich Not the Night. Contact Andrew, 8 Lanark Road, Ipswich IP4 3EH.
Leigh-on-Sea Sensible. Contact M Street, 158 Hadleigh Road, Leigh-on-Sea, Essex SS9 2LP.
Leigh-on-Sea The Swop Shop Club. Contact Ian Prentice ☎ 0702 710267.
London (East Ham) Amigaholics Club. Contact Kevin Bryan ☎ 071-580 2000 Ext 240.
London (Hampstead Garden Suburb) Amiga Club. Contact Imp ☎ 081 455 1626.
London (Winchmore Hill) Access Information Technology.Contact Darren ☎ 0956 229729.
London PD for beginners. Contact M.Macias ☎ 071/924/5528 before 6pm. 14 Totteridge House, 15 Yelverton Road, London ,SW11 3QQ.
London Twilight. Contact 13 Mavis Court, Ravens Close, London NW9 5BH.
Luton Amiga Users Group. Contact Dave ☎ 0582 481952.
Mundesley APDEG (Amiga Public Domain Exchange Group).Contact Richard Brown ☎ 0263 720868.
Norwich AGA Exchange. Contact K. Phillips, 18 Brownshill, Cromer, Norwich NR27 0QA.
Norwich Magic Windows. Contact Frame, 26 St Benets Road, Stalham, Norwich, NR12 9DN.
Romford Digital Disk Amiga. Contact David Cowell ☎ 081 590 2546.
Rye Rye Amiga Group. Contact Oliver Campion ☎ 0797 222876.
Sittingbourne Sittingbourne Co-op Amiga Club. Contact Andy ☎ 0795 842 608. The Bungalow, Keycol Hill, Newington, Sittingbourne, Kent ME9 8NA. Postal memberships offered. Support BBS 081 905 7002 (data).
Southampton Blitz programming Club. Contact mr D Collins, 6 Bentley Green, Southampton S018 5GB.
Southend-on-Sea Southend Team. Contact ☎ 0702 333974.
Sutton Agnus. Contact Philip Worrel, 115 Brocks Drive, North Cheam, Sutton, Surrey SM3 9UW.
Thetford Bizart Diskmag. Contact Stephen Marghan, Timberton House, The Mount, Buckenham Tofts, Thetford, IP26 5HP.
Thornton Heath AmigaBASIC club. Contact: Imran Ahmad ☎ 081 689 9102.
Watford Hertfordshire Amiga Users Group. Contact Keith Alexander ☎ 081 421 1784.
West Watford AmigaSoc. Contact Neil Cartwright ☎ 0923 248483.
Windlesham Ninja Software PD. Contact Gary Bowen (0276) 479615, 11 Hutton Close, Thorndown Lane, Windlesham, Surrey, GU20 6DN.
Witham Amiga Witham Users Group. Contact K Anderson ☎ 0376 518271.
Worthing Imagine, Lightwave, Real 3D objects. Contact Michael Moorfield, 4 St Botolphs Crt, St Botolphs Rd, Worthing, West Sussex BN11 4JH.
Yarmouth Robotronix Amiga Club. Contact P Symonds ☎ 0493 667161

SOUTHWEST

Bodmin Amiga Users Klub (Bodmin). Contact Jack Talling, 1 Windsor House, 19 Castle St, Bodmin, Cornwall PL31 2DX.
Bournemouth Hot Warez Dudez. contact Nick Leonard ☎ (0202) 424528. 11 Woodside Road, Southbourne, Bournemouth, Dorset.
Bournemouth Amiga Club. Contact P Chamberlain ☎ 0202 296714.
Bristol Avon Micro Computer Club. Contact Roger or Bob ☎ or Fax 0272 311642.
Bristol Bristol Amiga Club. Contact 3 Parkstone Avenue, Horfield, Bristol BS7 0BX.
Bristol EmuSoft. Contact Nalpex, 48 Longhandstones, Cadbury Heath, Bristol BS15 5AP.
Bristol Game Swap Club. Contact Ade Ajidahun ☎ 0272 240399
Dukinfield C.C. Swapshop. Contact Tom Hampson ☎ 061 339 9488.
Exeter Exeter 16-bit User Group. Contact Andrew Deeley/Phil Treby at 25A Gloucestershire Rd, Exwick, Exeter, EX4 2EF.
London PD for beginners. contact M.Macias 071/924/5528 before 6pm. 14 Totteridge House, 15 Yelverton Rd, London ,SW11 3QQ.
Reading Charlies PD. Contact Charles Read, 10 The Cedars, Tilehurst, Reading, Berks RG3 6JW.
Salisbury CHUD. Contact Mr M Sellars ☎ 0980 33154.
Taunton Imagine Object Makers. Contact Charles Mo, 16 Calder Crescent, Taunton, Somerset TA1 2NH.
Torquay Ami-Info. Contact Paul Caparn, Homeside, Higher Warberry Road, Torquay, Devon TQ1 1SF.

MIDLANDS

Birmingham 68000 in Birmingham. Contact Mike Bedford–White, 16 Westfield Rd. Acocks Green, B'ham B27 7TL.
Birmingham Software Exchange Service. Contact Michael Pun ☎ 021 459 7576.
Coventry Coventry and Warks Commodore Computer Club. Contact Will Light ☎ 0203 413511.
Derby Living Poets Society. Publication and appraisal of creative writing. Sean Woodward. Fido 2: ☎ 2503/104; 11. Menin Road, Allestree, Derby,DE22 ZNL, UK.
Hereford Hereford Amiga Group Help. Contact John Macdonald ☎ 0981 21414.
Leicester NFA. Contact NFA Productions (0533) 661 610. PO Box 323, Cambell St. Leicester.
Loughborough Leicestershire Amiga Users, Contact Daz or Eddy ☎ 0533 375 147 or (0509) 267 198. PO Box 10, Mountsorrel, Loughborough, Leicestershire LE12 7ZZ
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Nottingham East Midlands Amiga User Group. Contact Richard Haythorn ☎ 0602 298075.
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Solihull Sid The Kid Amiga. Contact Sid Reeves, ☎ 021 705 8619.
Solihull Solihull Computer Users Group. Contact Rich or Lee, 41 Leafield Road, Solihull, W. Midlands B92 8NZ.
Stoke-on-Trent The Amiga Studio. Contact Dave Rose (0782) 815 589, 25 Zodiac Drive, Chell, Stoke-on-Trent, Staffordshire, Midlands ST6 6NJ
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Telford Shropshire Amiga Link. Contact N Cockayne ☎ 0952 591376.
Telford West Midlands Amiga Club. Contact Kevin Genner Telford Snooker Centre, Canongate, Oakengates, Telford, Shropshire.
Witney Cacophony (Unlimited). Contact Mark Wickson, 49 Perrott Close, North Leigh, Witney, Oxon OX8 6RU.

NORTHEAST

Balby Warpdrive. Contact B Scales ☎ 0302 859715.
Barnard Castle Amiga Users' Club. Contact Paul Kellett 67 Green Lane, Barnard Castle, County Durham DL12 8LF
Barnsley Access Amiga User Club. Contact Mark Grimshaw, 20 Lilydene Ave, Grimethorpe, Barnsley, South Yorkshire S72 7AA.
Barnsley Amiga Programmers' User Group. Contact Andrew Postill, 2 Selby Road, Newlodge, Barnsley, South Yorkshire S71 1TA.
Catterick Champion PD Club. Contact Steve Pickett, 31 Somerset Close, Catterick, N Yorkshire DL9 3HE.
Chester-le-Street Chester-le-Street 16-Bit Computer Club. Contact Peter Mears ☎ 091 385 2939.
Darlington Darlington Commodore Users Club. Contact Steve Wheatley, 1 Ruby St, Darlington, Co Durham DL3 0EN.
Darlington Jemsoft Amiga Users. Contact Danwood, 3 Cavendish Drive, Darlington, Co Durham DL1 2GQ.
Darlington Northern Amiga Users Group. Contact Membership Secretary, PO Box 151, Darlington, County Durham DL3 8YT.
Durham The Amiga Club. Contact G Starling, 31 Pine Lea, Brandon, Durham DH7 8SR.
Harrogate Club 68000. Contact Chris Hughes ☎ 0423 891910.
Houghton-le-Spring Club Amiga. Contact Chris Longley, 5 Bowes Lea, Shiney Row, Houghton Le Spring, Tyne and Wear.
Keighley Pennine Amiga Club. Contact Neville Armstrong ☎ 0535 609263.
Mickley Nothing But AMOS Monthly disk magazine. Contact Neil Wright ☎ 0661 842292.
North Berwick East Lothian Amiga Group. Contact Mr J Curry ☎ 0620 2173.
Otely Harley's PD Swaperama. Contact G Varney ☎ 0943 466896.
Rotherham Software City. Contact N Richards ☎ 0709 526092.
Sheffield Steel PD. Contact James Whitehead, 33 Middle Cliffe, Drive Crowedge, Sheffield S30 5HB.
Spalding TDM. Contact Gedney Marsh, Spalding, Lincolnshire.
Stocksfield Blitz User Group. contact Neil Wright, 39 Riding Dene, Mickley Square, Stocksfield, Northumberland, NE43 7DL.
Sunderland Blitter. Contact Philip Kruman, 213 Fordfield Rd, Sunderland SR4 0HF.
Sutton-on-Sea Aden PD Club. Contact Den Rounding, 8 Primrose Lane, Miami Beach, Trusthorpe Road, Sutton-on-sea, Lincs LN12 2J2.
Tunstall The Amiga Studio. Contact Dave Rose ☎ 0782 815589.
Washington Mainly Amiga. Contact Ray Scott ☎ 416 9189.
Whiteley Bay Club Futura. Contact G Holland, 16 Hermiston, Monkseaton, Whitley Bay, Tyne and Wear NE25 9AN.

NORTHWEST

Accrington New Hall Amiga Users Club. Contact Bill Grundy ☎ 0254 385365.
Blackburn Blackburn Amiga Users Group. Contact Eric Hayes ☎ 0254 675625.
Blackpool Channel Z Diskmag. Contact Darren Busby, 3 Edelston Rd, Blackpool FY1 3HN.
Fleetwood Fylde Computer Club. Contact Colin Biss ☎ 0253 772502.
Lytham St Annes Amiga Users Group Part 2. Contact Andy Wilkinson ☎ 0253 724607.
Macclesfield Computer Club (Est 1983). Contact D. Latham (chairman) ☎ (0625) 615 379, Fax: (0625) 429 667. c/o Grantham House, Macclesfield, Cheshire SK10 8NP.
Oswaldtwistle Hyndburn Amiga Users Club. Contact Nigel Rigby ☎ 0254 395289.
Skelmersdale Computeque. Contact Steve Lalley ☎ 0695 31378.
Stamford Under 18 Only. Contact Joe Locker ☎ 0780 64388

SCOTLAND

Angus Angus Amiga CDTV club. Contact J Robertson ☎ 0356 623072.
Bathgate Lothian Amiga Users Group. Contact Andrew Mackie, 52 Birniehill Ave, Bathgate, W Lothian EH48 2RR.
Cowdenbeatrh Amiga FX. Contact Ryan Dow ☎ 0383 511 258.
Dundee Tay-Soft PD Club. Contact Dave Thornton ☎ 0382 505437.
Dunfermline Dunfermline Sound & Vision Club. Contact Stan Reed, 7 Maxton Place, Rosyth, Dunfermline, Fife KY11 2DG.
East Lothian Amiga Club (every 2nd week). Derek Scott ☎ 0620 823137, (Saturday 1 – 4pm). Bridge Centre, Poldrate, Haddington, East Lothian, Scotland.
Edinburgh Edinburgh Amiga Club. Contact Stephen Fradley ☎ 031 555 1142.
Edinburgh Edinburgh Amiga Group. Contact Neil McRea, 37 Kingsknowe Road North, Edinburgh EH14 2DE.
Glasgow Amiga Helpline. Contact Gordon Keenan, Amiga Helpline, 6 Skirsa Square, Glasgow G23.
Hawick Borders Teri Odin BBS. Derek Scott, 0450 373071. 26d Harden Place, Hawick, Borders, Scotland.
Inverness Highland PD.Contact David Paulin ☎ 0463 242431.)
Johnstone Using AMOS. Contact Colin McAllister ☎ 0505 331342.
Perth Perth and District Amateur Computer Society. Contact Alastair MacPherson 137 Glasgow Rd, Perth.
Redburn Redburn Computer Users Group. Contact Ruby Anderson ☎ 0294 313624.
W. Lothian Amiga Computer User Club. Contact Alistair Lyons, 18 Braehead, Bo'ness, W. Lothian, Scotland EH51 9DN.

WALES

Bangor Amiga Maniacs.

Contact Johnny, 8 Tan-y-Grais, Caernarfon Rd, Bangor LL57 4SD.
Carmarthen Bloomfield Video and Computing. Contact Mrs Beryl Hughes ☎ 0267 237522.
Clwyd ShieldSoft PD. Write to 26 Doren Avenue, Rhyl, Clwyd LL18 4LE, ☎ 0745 134 3044.
Clwyd Solo (Amiga). Contact Mike, 26 Doren Avenue, Rhyl, Clwyd LU8 4LE. ☎ 0745 343044
Neath Amiga Navigation. Contact Dave Thomas 4a, Allister St, Neath, W Glamorgan.)
Powys Blue Bedlam. Contact Michael Grant ☎ 0873 811791.

N IRELAND

N Ireland N. Ireland Amiga User. Contact Stephen Hamer, 98 Crebilly Rd, Ballymena, Co Antrim BT42 4DS.
N Ireland Digital Intensity (diskmag). Contact Simon Denvir, 40 Old Cave Hill Rd, Belfast BT15 5GT.

SPECIAL INTERESTS, BBSs

Amiga Buzz BBS. Contact David Clift on ☎ 0924 491 461.
Amiga Sports Fans. Contact Jamie Last, York House, Church Road, Elmswell, Bury St Edmunds, Suffolk, IP30 9DY.
Angus Amiga Musicians Club. Contact Gavin Wylie, Guthrie Street, Carnoustie, Angus.
Animeiga UK BBS Contact Chris Payne ☎ 0462 484 752 . 2400_14400 V32bis 8n1 24 hours a day/7 days a week.
Avenger BBS, Lincolnshire based board, opening times: Weekends 9pm 12am upto 14400 baud, Data (0507) 568318.
Basingstoke AMOS Programmers Exchange. Contact J Lanng, 7 Majestic Rd, Hatch Warren, Basingstoke, Hants RG22 4XD.
Bidwell BBS. Contact SYSOP Mark Lunt Modem ☎ 0582 863 906.
Birmingham The Junction Box BBS. Contact mark Pegler ☎ 021 321 2235.
Borders Teri-Odin BBS. Contact Derek Scott ☎ 0450 373 071.
Branston Fen Amiga Boatowners. Contact D Beet Lock, Branston Fen, Lincolnshire LN3 5UN.
Braunston Nr Daventry GFA Basic Forum. Contact J Findlay ☎ 0788 891197
Braunston, Nr Daventry Amiga E Support Group. Contact John Findlay ☎ 0788 891197.
Broadstairs AMOS Programmer Club. Contact Gareth Downes-Powell, 6 Brassey Avenue, Broadstairs, Kent CT10 2DS.
Chelmsford Independent Commodore Products Users Group. Contact David Elliott ☎ 0245 328 737
Chiltern Amigas BBS, contact Commodore Specialists (0296) 87522. 14400BPS, 37 Plough Close, Aylesbury, Bucks, HP21 9AD.
Cumbria (Barrow-in-Furness) The Power Plant BBS. Contact Neal Postlethwaite ☎ 0229 431590.
Dark Solution BBS. Sysop Andy Miller (0246) 277317. 24 hours a day,(300 14400 Bps). friendly sysop Loads of files.
Den's Den BBS. contact Sysop Dennis Luckett (0702) 464818, SouthendonSea, Essex.
DOZ BBS (Leics area) Amiga Only. SYSOP (0533) 461 665 from 6pm – 12am.
Enigma BBS – MAXnet, Internet access, online Amiga help, speeds up to 14400 (0275) 541 418 8pm–8am
Frost Free BBS (West Yorkshire area). SYSOP – Dave Naylor (0484) 842 341.
Glasgow 24-bit Club. Contact Gordon Keenan, 24-bit Club, 6 Skirsa Square, Floor 1, Glasgow G23.
Glasgow Action Replay Users Club. Contact Gordon Hagan, 66 Muirside Avenue, Kirkintilloch, Glasgow G66 3PR.
Guru Mediation BBS! 24 hours. Call 24 hours v.32bis on BBS +44 (0) 81 401 2502. CD-ROMs/Kewl Ansi. Call now or regret it!
Highfields CDTV User Group. Contact Gary Ogden, ☎ 0785 227059.
Highlander BBS. Contact Alan Walker, Mark Price ☎ 0452 384702 & ☎ 0452 384557.
Impulse BBS. Contact James Norris ☎ 081 698 8978.
Lingfield In Touch Amiga. Contact P Allen, 0342 835530, PO Box 21, Lingfield, Surrey RH7 6YJ.
Liverpool Nickelodeon BBS. Contact SYSOPS Mark Williams, Tony Ross ☎ 051 709 8508 (Liverpool).
London (Richmond) Micro Academy. Contact Don Pavey ☎ 081 878 1075.
London Independent Commodore Products Users Group. Contact the Membership Secretary (Fax 081 651 3428). ☎ 081 651 5436
London On-Line Network BBS. Contact ☎ 081 539 6763 (London).
Look Northwest BBS. Contact ☎ 0282 698380 or 0282 619518.
Lothian Independent Commodore Products Users Group. Contact David Hope ☎ 0555 811 955..
Macclesfield Independent Commodore Products Users Group. Contact Peter Richardson ☎ 0298 23644
Maidenhead Independent Commodore Products Users Group. Contact Mike Hatt ☎ 0753 645 728.
Manchester CDTV Users Club. Contact Julian Lavanini, 113 Fouracres Rd, Newall Green, Manchester M23 8ES.
New Whittington Digital Music Club. Contact Roger Hunt ☎ 0246 454280.
Normanton BASIC Programmers' Group. Contact Mark Blackall ☎ 0924 892106.
Plymouth Pilgrims BBS. Contact Jon Wickett ☎ 0752 366 939.
Rochford Ray Tracers. Contact Neil Hallam, 12 Meesons Mead, Rochford, Essex SS4 1RN.
Romford Phoenix Demo. Contact Frank ☎ 081 597 4661.
Rotherham Marksman (Trojan Phazer user group). Contact David Green, 67 Thicket Drive, Maltby, Rotherham, S Yorkshire S66 7LB.
Solent Independent Commodore Products Users Group. Contact Anthony Dimmer ☎ 0705 254969
South East Independent Commodore Products Users Group. Contact Len Beard ☎ 0689 830 934.
South Mostly Harmugs BBS. Contact Lee Sanders ☎ 0705 614 824.
South Wales Independent Commodore Products Users Group. Contact Mike Bailey ☎ 0446 775287
Stevenage Independent Commodore Products Users Group. Contact Brian Grainger ☎ 0438 727925
Stoke-on-Trent Independent Commodore Products Users Group. Contact David Rose ☎ 0782 815589.
Swindon Amiga Video Producers' Group. Contact J Strutton ☎ 0793 870667 before 9pm.
Swindon MUG – MED Users Group. Contact Richard Bannister, 6 Glevum Rd, Stratton St Margaret, Swindon SN3 4AF.
Sysop Auto Pilot BBS. New BBS, Amiga only. Wednesday Evenings from 7pm, all weekend. Generous ratio's for first 50 callers! Sysop, Gavin Dolphin, ☎ 0332 660768.
Sysop Frontier, Mathew Recardo. ☎ 0527 597531.
System One BBS. Contact ☎ 0743 791501.
The Cartoon BBS. Contact the Bartman ☎ 071 635 0592.
The Loft BBS. contact sysop crispy (24 hours, 14.4k) (0203) 545320.
The Neutral Zone (Star Trek BBS). contact Arklight or Gul-Ducat, Dunstable ☎ (0582) 475032. Dennis Luckett ☎ (0702) 464818, Southend-on-Sea, Essex.
The Power Station BBS. contact Sysop Alan Maylin & Neil Barrett, BBS (0375)640507.
Thetford CD BBS. Contact Paul Morris ☎ 0842 763639.
Trick or Treat II BBS. Contact Mark Meaney ☎ 0703 391 797.
Wallington Bible Bureau.Contact AD ☎ 081 669 7485.
Ware Gamer-Link. Contact Stu, 28 Churchfield, Ware, Herts SG12 0EP.
Warlock BBS. Contact Mr Manglin ☎ 031 659 5806
Warrington The CDTV Revolution. Contact Lee Beckett ☎ 0925 268819.
West Riding Independent Commodore Products Users Group. Contact Kevin Morton ☎ 0532 537318
Wigan Independent Commodore Products Users Group. Contact Brian Caswell ☎ 0942 213402
Witham Video Visuals. Contact Chris Brown, 4 Lavender Close, Witham, Essex CM8 2YG.
Witzend BBS. Contact Darron Fooks (0702) 470 469, 109A Leigh Hall Rd, Leigh on Sea, Essex.
Workington AMOS Programmers Group. Contact John Mullen at 62 Lonsdale St, Workington, Cumbria CA14 2YD.
Worlingham Sliver BBS (10pm - 3am). Mat Tillett, 0502 715296. 27 Hillside Avenue, Worlingham, Beccles, NR34 7AJ.

OVERSEAS

Australia Amiga Users Group of Western Australia. Contact Bill Sharpe-Smith PO Box 595, Cloverdale WA 6105 Australia.
Australia Comp-U-Pal. Contact Comp-U-Pal, 116 Macarthur Street, Sale, Victoria 3850, Australia.
Belgium AUGFL vzw. Contact Lieven Lema, Meesberg 13, 3220 Holsbeek, Belgium.
Denmark Danish AMOS user group. Contact Tom Poulsen, DABG, postbox 127, 2640 Hedehusene, DK Denmark.
France 16-32 Micro. Contact F Moreau, 132 rue Jean Follain, 50000 Saint-Lo, France ☎ 315220 02.
France Maritime Amiga Club. Contact CDR K Osei, GN Ships Refit Office, 51 Rue de la Bretonniere, 50105 Cherbourg, France. ☎ 33 33225447.
Germany Royal Air Force Amiga Club. Contact Stan Young, HMF RAF Laarbruch, BFPO 43.
Germany Worldwide PD Club. Contact Dave White, Berliner Strasse 39, 40880 Ratingen, Germany ☎ 02102 499729 (Germany).
Gibraltar Gibraltar Amiga Users Club. Contact David Winder, 7 Lime Tree Lodge, Montagu Gardens, Gibraltar ☎ 010 350 79918.
Greece Amiga Athens club. Contact Stefanos Papamichael, 9 Derfeld Rd, Patisia, 11144 Athens, Greece ☎ 01/2027973.
Greece Amiga Pros User Group Greece. Contact Stefanos Siopoulos, 52 Silivrias Str., N. Smyrni 17123, Athens, Greece, ☎ 01/9349963.
India Indian Amiga Friends. Contact Bilal, 46 Paragon 405 Lokhandwaza Complex, Andheri (W), Bombay-400058.
Ireland Amiga Addicts. For info SAE to A Minnock, Clonkelly, Binn, Co Offaly, Ireland.
Ireland AMOS Users.Contact Brian Bell, 8 Magnolia Park, Dunmurry, Belfast BT17 0DS.
Ireland City Centre Amiga Group. Contact Patrick Chapman, 70 Ballygall Crescent, Finglas East, Dublin II, Ireland, ☎ 345035.
Ireland CUGI Commodore Users Group of Ireland. Contact Geoffrey Reeves, c/o St Andrew's College, Booterstown Avenue, Blackrock, Co Dublin. ☎ +353 1 288 3863.
Ireland Navan Computer Club. Contact Mark Arnold, Cannistown, Navan, Co Meath, Eire ☎ 046 21078.
Ireland Northside Amiga Group. Contact William Kelling, 10/A Rainsford Avenue, Dublin 8, Ireland ☎ 01 532 807.
Ireland Software Exchange Club. Contact Michael Lacey, Fern's Post Office, Enniscorthy, Co. Wexford, Republic of Ireland.
Malta HTS (Malta). Contact K Cassar, Block 1 Flat, 6 H E Hal-Tmiem, Zejtun ZTN07 Malta ☎ 674023.
Malta Malta Amiga Club. Contact Zappor, PO Box 39, St Julians, Malta, ☎ 440453
Portugal Software Asylum. Sid Sanches, Portugal ☎ 062 831566. Apartado 6156, 3000 Coimbra, Portugal.
Singapore Singapore Sling. Contact Eric Chai ML, Block 4 #14-413, Pandan Valley, Singapore 2159, ☎ 65 4680630.
South Africa Amiga Users Exchange (AUX). Contact Ken Turner, 24 Du Plessis Avenue, Edgemead, 7441 Cape Town, S. Africa. Internet: kturner@aztec.co.za
Sweden 32-bit ware. Contact 32-bit ware, Ekorrstigen 10, 147 63 Tumba, Sweden.
Switzerland Amiga User Group Switzerland (AUGS) Contact AUGS ☎ ++41 34 45 3078. Bahnhofstr. 7, CH–3426 Aefligen, Switzerland. BBS: +41 (0) 62 44 32 27. We have our own Net on several Swiss Amiga BBSs called "AUGS-Net".
USA Japan Amiga Group.Contact: Rick Gardaya, PSC 78 Box 3876, APO AP 96326 USA.

Note: this list is provided as a free service for amateur, non-profit-making user groups. Amiga Shopper does not endorse or recommend any particular group and cannot be held responsible for any possible losses.

WE NEED YOU – SEND IN YOUR DETAILS!

***Amiga Shopper* wants a truly comprehensive list of all the Amiga user groups worldwide. If your user group isn't on this page, send the form to *Amiga Shopper* User Groups, 30 Monmouth Street, Bath BA1 2BW.**

USER GROUPS — AS42

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Talking Shop

Have your say. We've got £25 on offer for the best letter each month. Send your opinions to: "Talking Shop", Amiga Shopper, 30 Monmouth Street, Bath, Avon BA1 2BW.

PRE-PURCHASE PENSIVENESS

£25 WINNER

Piracy may be the topic of the moment where the Amiga is concerned, but who needs it? This letter was typed into a coverdisk word processor (*Interword*). I am working my way through the tutorials which accompany the *Imagine 2.0* coverdisk. I am waiting for the manual and video for *Clarissa* as I intend to produce animations. These are high quality programs which did not cost a lot, but they did give me the opportunity to try something which I didn't know whether I would like or be any good at.

The likely outcome is that I will spend £95 on *Imagine 3.0* and Impulse will have another sale. When the software costs £100 plus a time, then I prefer a "try before you buy approach". The benefit is that, rather than have a zero potential sale in me, they just might get one or two definite cash-in-the-bank jobs. Who needs to pirate when the coverdisks are this good? Better pay for a few full price programs which you can really use rather than have a million pirated ones where you can't get past the loading screen.

And my friend with the 486 can get anything you care to name for his PC. He has promised me just as much if I get one. He is at University and they get the bloody programs from the network there! As he said, he's spent £1500 on the hardware but he will get the software for free! *Microsoft Work, FI GrandPrix, Harvard Graphics* etc. Once they are on one hard disk they multiply like sex starved rabbits.

But Jolyon Ralph has hit one nail right on the head. It's no good having the kit if no-one develops programs which will take advantage of it. Your survey should provide the answers. How many people can view multicolour, interlaced screens (monitor), or don't worry about ten disk programs (hard drive), or can render *War and Peace* in an hour (extra RAM accelerator?) If the developers aren't told the market potential then they will not produce the goods, will they? Look at your readers' adverts. Most Amigas are now well beyond 1Mb RAM and an extra disk drive. *Final Writer* is the way forward.

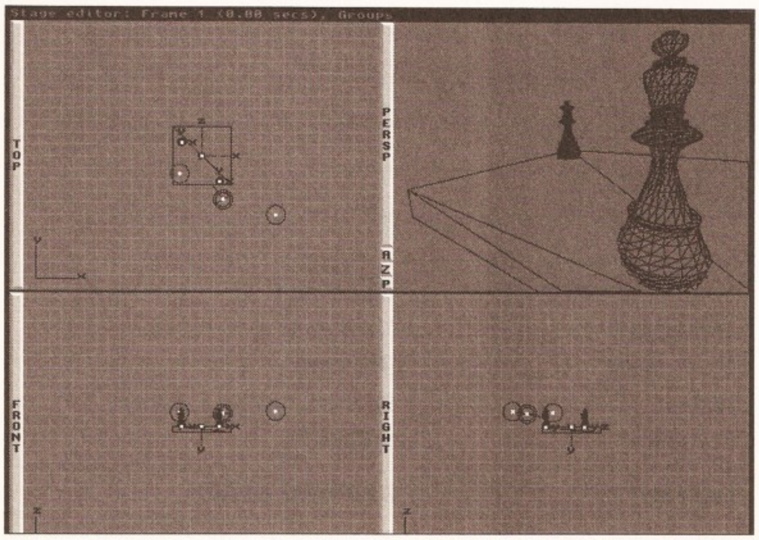
Well, my soapbox is about to collapse and I need a drink. Your magazine has been one of the greatest aids in my understanding of the Amiga and has prompted me to persevere through the most daunting of problems. Your reviews are scoured for good advice and I won't spend my money without a good reference from you. You are a bit good!

John Coates
Hull

Gosh. I'm all overcome with emotion. I'll buy you a beer next time you're in the area.

Coverdisks are a great way for a user to build up their software collection, but you shouldn't forget that you are usually getting an older version of a program than the one which is currently financially available, so it may not have all of the bells and whistles which the adverts shout about. As you say, trying out a program is often a problem, especially when you are planning to spend several hundred pounds on it. Although most mail order companies do an extremely good job of selling Amiga equipment, you really can't beat going into a shop and playing around with the software for a couple of hours to see what it can do.

It's certainly true that many Amigas are becoming more well endowed, and the popularity of program such as *Final Writer* and *Imagine 3* show that there are people out there who are prepared to spend plenty of money to get the most out of their machines. However, there are plenty of people out there who can't afford to upgrade their machine, and the increase in the minimum of memory required to run a program can sometimes leave them behind. Fortunately the Amiga isn't as bad in this respect as the PC, where many companies are now producing software which needs a 486SX25 and 8Mb of RAM at the very least. Try getting one of them for less than £900.



Do programs like Imagine really benefit from coverdisks? See "Pre-Purchase Pensiveness".

REAL GONE REVIEW

As UK Technical Support Manager for Activa International I read the recent review (issue 38 of *Amiga Shopper*) *Real 3D* with great interest. Unfortunately I found it to be inaccurate and misleading. A complete list would take a couple of pages of text so below is a brief summary.

***Real 3D* can do lens flares in almost exactly the same manner as *Aladdin*, i.e. apply them as textures to objects in front of the camera.**

Tool Windows are used in many Amiga applications but the review is the first time I have seen them referred to as confusing.

The rendering speed of b-splines was increased 3-4 times in the version 2.4, but the user can also convert them to Phong shaded surfaces at render time to reduce the render time even more. *Real 3D* also offers CSG primitives which render faster than Phong shaded surfaces and without any facets.

Creating a Wave method is done in the same way regardless of how many objects it is applied to. The review states that *Real 3D's* animation features are as powerful as *A4D's* but can't compete with *Aladdin's* gas and liquid effects. This implies having gas and liquid effects is just as important as inverse kinematics, collision detection, etc. This is for the reader to decide, not the reviewer.

Boolean operations come in only 2 varieties – AND and AND NOT. The first only renders the parts of the objects that overlap, the second uses one object to cut a hole in another. Neither of these would affect spline mapping as stated in the review. Spline mapping uses the freeform surface as the mapping geometry and boolean operations do not alter that geometry in any way.

Since release there have been five upgrades, one of which was chargable. As neither of the reviewers are registered users with Activa International how could they expect to know about upgrades. A newsletter is currently being produced and we also offer free technical support via telephone, fax, letter, Fidonet, and Internet. Finally, the latest version of the program can always be found on our BBSs around the world along with textures, images, animations, objects and tutorials.

Andy Jones
Activa International

According to the Little Oxford dictionary, a review is a "published account or criticism of book, etc". Our reviews are designed to do two things:

1. Give information on a product

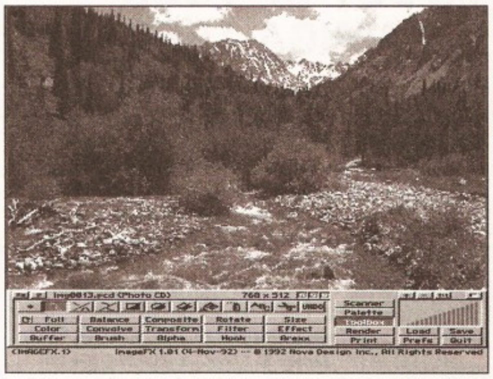
2. Asses the usefulness and value of a product.

In the words of *Amiga Shopper* launch editor Bob Wade in issue 1: "when we review something, it is put in the hands of a specialist in that area and then tested long and hard until we're sure we've got it right". R Shamms Mortier is a professional graphics artist, so he was a perfect choice to review *Real 3D*. As a professional animator, Shamms will have his own preferences in terms of software, but I really can't see a problem with this. A good review will give you both the facts and an opinion on the program.

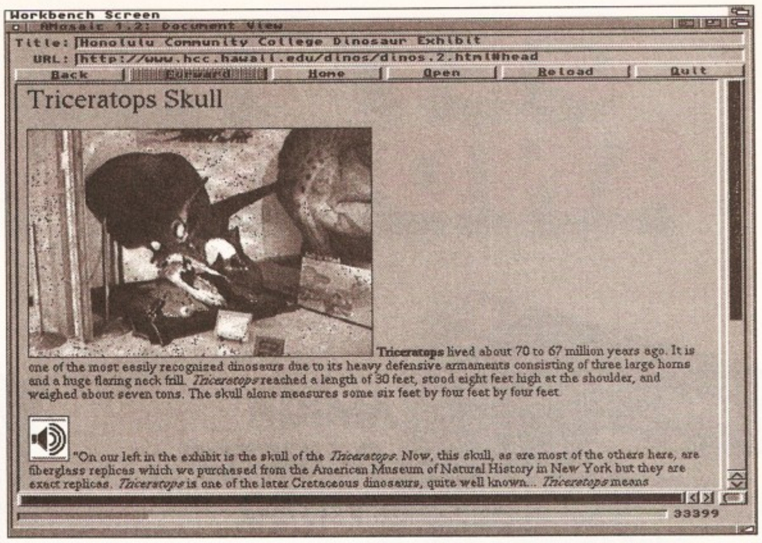
Anything that just gives you the facts isn't a review. One of the reasons people read reviews is to get an opinion on a product, not just to read about the features of a program. Furthermore, the reviewer in this case is definitely qualified to provide an opinion on the usefulness of a feature as he spends a significant portion of the day using programs of this type.

However, I do realise that not everybody will necessarily agree with the opinions of a reviewer, which is why I have introduced the idea of getting several different opinions on important programs. Where possible, these opinions will be from people with a variety of different needs to give a full view of how well the program fits its required purpose as far as they are concerned. See the *Imagine* review in issue 40 for an example of what I mean.

Finally, I'm glad to hear that you offer technical support to *Real 3D* users. As Shamms is based in the USA, it's not surprising that he wasn't aware of any UK technical support. With a complex process like ray tracing and a powerful program like *Real 3D*, it's very easy for users to get confused and have problems with their software. I think that by supplying technical support you are setting a very good example for other Amiga programmers to follow.



Do you need PPMto ILBM to read Photo CDs? See "Kick the Start".



Want to get connected to the Internet? Go to "Get Netted" and find out more.

KICK THE START

About converting PhotoCDs on the A500 (p.44) – what's that PPMtoILBM for? After all, the great thing (one of the great things) about Wasp is that it can read the PPM format. So cut out the middle man, that's what I say.

About writing for V1.3 of the OS (p55) – if you do decide to do something like this, don't ever test the version of Kickstart. Some of us still use WB1.3 over KS1.2 (it's sad, I know), and I know of no WB1.3 program which doesn't run on KS1.2. I'm saying this, of course, because of the *Clarissa* program given with *Amiga Format* (and where were all those details about free video and such, that weren't in the issue?). The program only lets you run it on KS1.3 or higher, and I had to patch it in order to run it on KS1.2 (and it sure runs).

As for the person who asked about assembly programming and 3D graphics (p50) – first there's the classic and highly recommended book "Computer Graphics – principles and practice" by Foley, Van Dam et al (the et al means that I don't remember the two others – I think they were Feiner and Hugh, or something of this sort – hope I remembered the name of the book correctly).

There's one problem with such graphics texts, and that's the actual implementation of the algorithms, which often leave a lot to be desired speed-wise. I seem to remember that there was a book about 3D graphics in assembly for the Amiga. This should contain the necessary tricks to speed the calculations (of at least some types of 3D renderings).

Lastly, about that person with the old laser printer – why don't I find old unused laser printers which I can take home? It's just not fair.

One last thing for now – do you really find a copy of *Mein Kampf* boring? Not that I've read it, but I have read a book about the plans of the Nazis and it was quite interesting.

Eyal Teler
Teler@cs.huji.ac.il

WASP can achieve much the same thing as PPMtoILBM, so it's really down to personal preferences. WASP can also do any number of other things, so if you are looking at doing some work with Photo CD images, it's well worth considering.

I'm not sure that using Kickstart 1.2 with a different version of Workbench is such as good idea. I'm sure that many programs other than *Clarissa* will be having problems with this. At the risk of sounding like an advert for Commodore, you should seriously think about upgrading. Especially now as Kickstart and Workbench 3.1 are available for your machine. See page 16 for our full review and feature list.

Equipment such as old laser printers will only find its way to the selected few. Such stuff isn't simply found, it chooses you. Perhaps you simply haven't been chosen yet.

Mein Kampf has to be quite simply the most tedious, badly written and unreadable book I have ever read. Try reading Allan Bullock's "Hitler and Stalin" instead to find out the real truth about what a sad and unpleasant little man Hitler really was – and if that offends any Nazis out there, too bad.

MORE MORE MORE

Now one more comment about this August issue. In the AMOS column, you mention the Turbo Library, and say that the two things you can't have enough of in a computer are speed and speed. You're wrong, of course. There are four things, and the first two are storage space and storage space. Only the next two are speed and speed. Or maybe it's "storage space, speed, storage space, speed"... Well, actually, there may be more RAM somewhere too.

So, it's (not necessarily in order):

- **Storage space**
- **Speed**
- **RAM**

Any ideas of other things you can't have enough of?

[Maybe resolution...?]

Eyal Teler
Teler@cs.huji.ac.il

You forgot to mention sex and beer. Oh I forgot, you can't get those on your computer – too bad!

Anyway, with things like this I tend to agree with William Blake when he wrote that "The palace of wisdom lies on the road of excess" (from the Proverbs of Hell), so if anybody has any 1 Gigabyte drives, accelerator cards, RAM chips or large quantities of beer that they want to put towards the cause of pushing back the boundaries of human experience, you know the address. There will, of course, be RAM chips and hard disks a plenty at the *Future Entertainment Show*. See page 5 for more details on the show – don't miss it!

GET NETTED

Thanks for the great issue (*AS 40*) about the Internet. Although I've used the Net quite a lot over the past seven years there is still a lot for me to learn. I wish that there had been such an article back then.

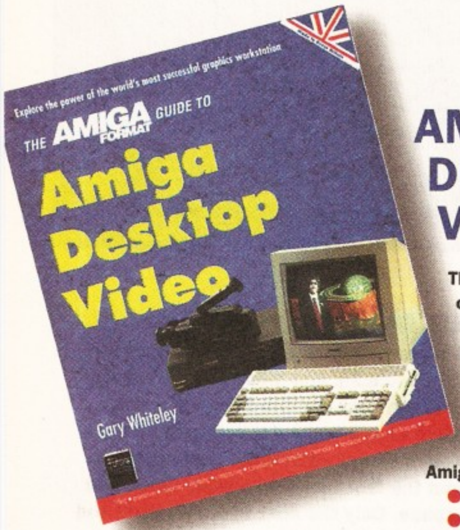
Unfortunately, it seems that a few typ(ographical/setting) errors crept in on page 15 in the section on Listservers.

For example, weird-1 should have read weird-l (wierd-L) and I suspect that catia-1 cinema-1 and penpal-1 should similarly have been catia-L cinema-L and penpal-L.

Also, I thought readers might like to know that ftp.nisc.sri.com no longer accepts anonymous FTP (I know, I tried earlier this morning). Anyone wanting to obtain the "list of

continued on page 85

GET THE BEST INFO
AND ADVICE MONEY



AMIGA DESKTOP VIDEO

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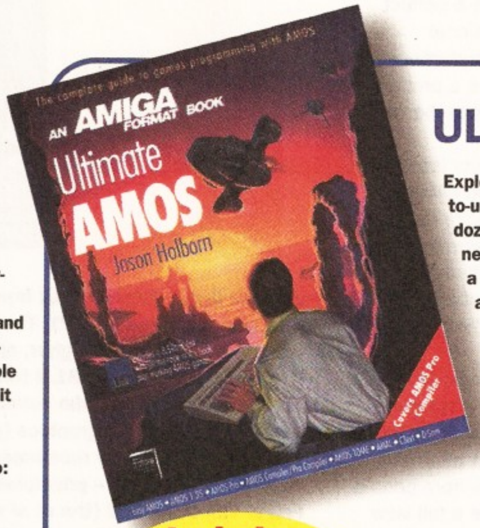
Amiga Desktop Video shows you how to:

- Title your own videos
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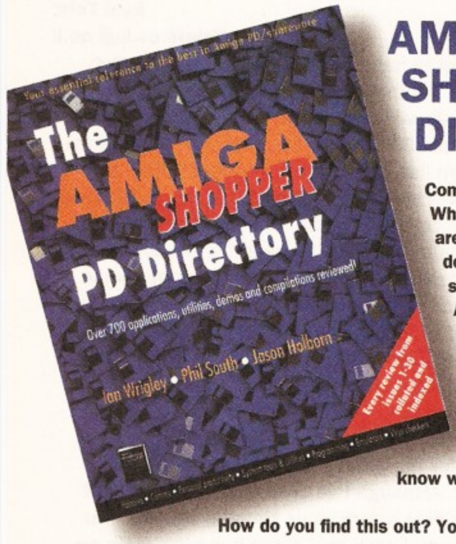
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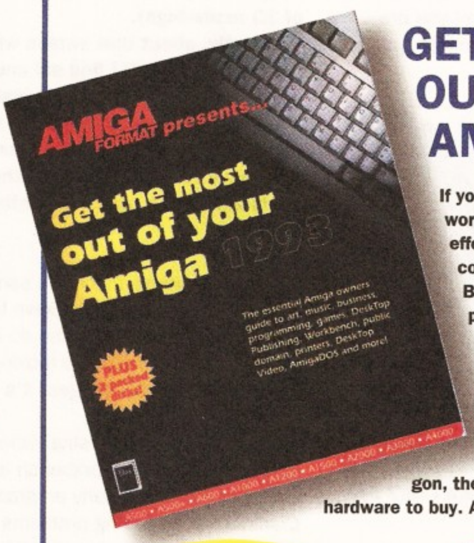
But first you need to know what software is available. And then you need to know what it does. And then you need to know whether it's any good.

How do you find this out? You find out here!

The Amiga Shopper PD Directory has been assembled from the first 30 issues of Amiga Shopper magazine. All the PD/shareware reviews since issue one have been collated, compiled and indexed in a single 500-page volume.

Programs are divided into categories, reviewed and rated. We name the original suppliers of the programs and we've also included a directory of current suppliers at the back of the book.

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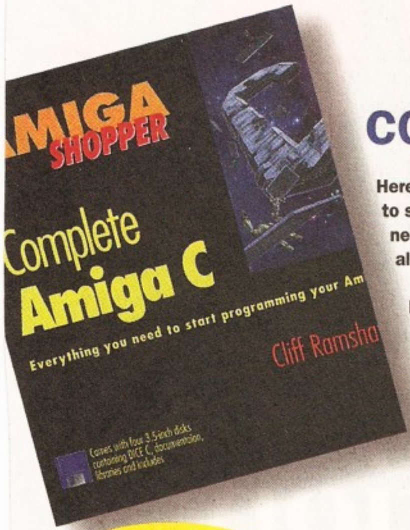
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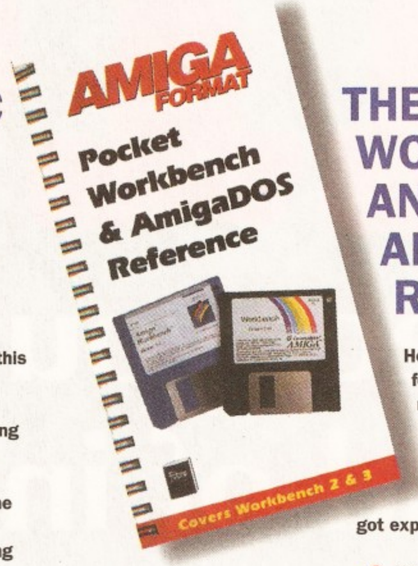
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continued from page 83

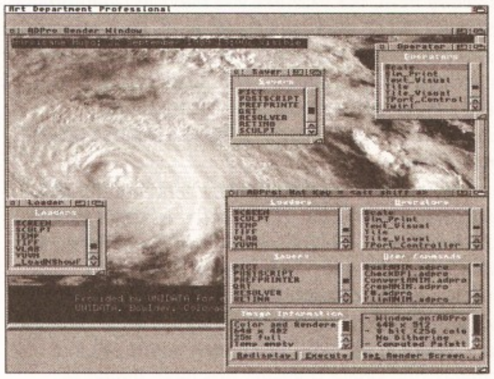
lists" should try obtaining the file /pub/uunet/inet/netinfo/interest-groups.Z from unix.hensa.ac.uk

As for the subscription charges – well, I still think *AS* is good value for money at £2.50 (especially with a subscribers' cover disk). Like anyone else I mourn the passing of the days when *AS* cost a mere 99p but times move on and considering the wealth of info and the quality of production contained in the mag, two and a half quid seems almost cheap!

Paul Walsh
PaulWalsh@msmail.uce.ac.uk

Whoops. You are correct in pointing out the errors. There are always a few errors which sneak in, especially with something as difficult to read through as a list of listservers.

Anybody who wants to know where to find the interesting things on the Internet should check out the book included with this issue. The list-of-lists is also a good source of further information, as long as you don't mind the rather long download that it will take to get hold of it.



Can Adpro compete with programs like PhotoShop? See "Serious Stuff".

SERIOUS STUFF

I have owned an Amiga from 1987 and I have seen a lot of change, some for the better, some for the worse. I would like to see some changes in Amiga software.

First of all, I would hope the new buyer of our beloved Commodore invests in getting some serious software behind the Amiga – software like *Word, Quark Xpress* and *Photoshop*. These programs have been enjoyed by owners of lesser machines for a long time and I think that it is about time Amiga owners had a chance to use them. I would also like to see the new buyers of Commodore give schools and students a discount. This may encourage a lot more people to buy the Amiga and experience it.

Last of all, I would like to see a joypad made for the Amiga and games to support it. In 1987 a one button joystick was good but in 1994 more buttons are needed. How many times have you played a game with keys and joystick? Annoying, isn't it?

A. Shah
Northfleet

Games? What are they? Personally, I find one button is enough (as it means that you can shoot those nasty aliens in *Deluxe Galaga*), although Graeme (being a *Streetfighter 2* junkie) would probably agree with you. The solution is possibly in the form of the CD32 controller, as most A1200s can read all of the buttons on this with no modifications. In fact, a normal Amiga can read all of the buttons on a Sega style pad by moving one cable on the joypad lead and some clever programming. If you want details of this, see issue 44 (March 1993) of *Amiga Format*, which also contained some Devpac source code to read the buttons.

Pagestream 3 looks like giving *Quark Xpress* a good run for its money, and we will be doing a full review just as soon as we get hold of a copy. In fact, *Quark Xpress* (a high-end Mac and PC DTP program) will be one of the programs we will be comparing it with and measuring it against. In image processing terms, the Amiga has several extremely strong programs (*ImageFX* and *AdPro* to name but two), and I don't think it's likely that Adobe (the company who produce *Photoshop*) are interested in doing an Amiga version. Never mind, it's their loss.

If you're interested in testing out any of these programs, then don't forget that there will be a lot of Amiga stuff at the *Future Entertainment Show*, which is at Earls Court 2 from the 26th to the 30th of October (ticket hotline ☎ 0369 4235). People like Soft Logik (the programmers of *Pagestream 3*) have been invited, and there will be lots of other Amiga people wandering around. Not only will there be a lot of Amiga stuff for sale, but this will also be your chance to meet the *Amiga Shopper* team and see what they really look like. If you think you can cope with it...

GET GOING

I have an unexpanded A1200 which I use mainly for Flight Simulation. Some of the simulators like Digital Integration's "Tornado", Domarks "AV8B Harrier", Dynamix "A10 Thunderbolt" run rather slowly even on this machine, so I was contemplating adding some fast RAM and/or an accelerator board.

Reading the adverts, you get the impression that 1Mb of Fast RAM will double the speed of the A1200. The addition of an accelerator like the Viper 68030 turbo with 2Mb of Fast RAM claims to give a 440 per cent speed increase.

In Flight Simulation terms, does this mean that jerky old "Tornado" which can barely manage three frames per second will suddenly do better than 12 frames per second with the Viper added?

And what difference will an FPU make? Apparently this speeds up "maths intensive operations". Well, calculating loads of polygon graphics in a flight simulation environment seems the perfect application for an FPU, so will it work with my Flight Simulators?

G Eustace
Leeds

For the full lowdown on A1200 RAM expansions and accelerators, check out our supertest, starting on page 10.

The addition of Fast RAM to a machine will make a significant difference, although the amount of speed increase you get will depend on the program you are running. What happens is that the CPU is no longer having to argue with the custom chips over who is allowed to access memory, as the custom chips can be accessing Chip RAM and the CPU can be accessing Fast RAM at the same time. This effectively means that your Amiga can be doing two things at once, which can't be a bad thing in my opinion.

The addition of an accelerator will give an even bigger improvement, as this speed up nearly every aspect of the Amigas operation. With games such as *Tornado*, the Amiga spends an awful lot of time on calculating the 3D polygons which form the objects you see in the game, so if these can be worked out quicker, the frame rate will improve.

FPUs are, as you say, chips which are designed to carry out maths operations very quickly, especially ones involving floating point maths. However, I don't think it would really make much difference to your flight simulators, as programs will only use the FPU if they have been specially written to do so. Most games aren't, as the programmers don't think that there are enough FPU owning Amiga users out there to make it worthwhile. AS

GET RICH QUICK!

*Well, I suppose that £25 isn't really all that much, but it's not bad, is it? You could put it towards buying a new hard drive, or simply go down the pub with a young friend and drink several pints of orange juice. Of course, if you are going to go down to a local hostelry, you'll need some interesting conversational topics to keep the talk flowing deep into the night. Here's a list of things that we find interesting and things that would make us find a new local. Incidentally, these topics are also the sort of things that we want to hear your views on in these pages.

CHARMING CORRESPONDENCE

- The Commodore management buy-out
- The Internet
- Interesting uses for your Amiga
- Changes in Amiga Shopper
- The CD revolution

NEGATIVE NOTES

- The cost of telephone calls
- Dave Winder sightings on TV or radio
- Why Star Trek is better than Babylon 5
- The Assembler column (see page 28)
- The rail strike

CONTACTING THE TALKING SHOP

To add your contribution to any of the debates going on in this page, send your letters to :

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All letters received at these addresses will be considered for publication unless you specifically advise us otherwise.

SOFTWARE FOR FREE

Graeme Sandiford continues his search for the best in PD and shareware programs.

Yes that's right, free software and I've waded through bucket loads of blue disks to find the very best available just to save you, our beloved reader, valuable time. We've found plenty of utilities to help you get the best out of your Amiga. We've also found many a things that will make you chuckle too – what more could you ask for?

FINALWRAPPER

Scribble PD U371

If you managed to catch our mammoth word processor roundup, you will, no doubt, have been impressed by the winner – *FinalWriter.* It was deemed to be the best overall word processor for the Amiga. *FinalWrapper* is not, as you might think, a PD imitation, rather it is a set of macros that aim to increase *FinalWriter's* abilities.

FinalWrapper is the main macro, but one or two other useful macros have been included as well. *FinalWrapper* will wrap text around the shape of an oval or into a spiral based on an oval. This is an extremely useful facility to have, and is found in many high-end DTP packages. This feature can be used to really spice up a sales leaflet or flyer.

Using this macro and the others is very simple and only require that you select certain items and then execute your chosen ARexx macro. The other macros that have been included are CentreObjects, StretchObjects, ExpandObjects, SizeNOblique, Text2Block and FinalWaver.

To use the *FinalWrapper* macro you first need to write your portion of text and then create an oval for the text to be wrapped around. After selecting both the text and the oval and executing the macro you are then presented with an option box. This box can be used to define how the text will be wrapped. You can specify the size of the arc (in degrees), the spiral (the percentage change in angle from the inside to the outside), the starting and finishing angle, which of the resulting objects you wish deleted, whether you want them be grouped and any other adjustments that you like made.

Once you have entered all of the options you want, you can sit back and watch the macro generate the text effect. Most of the remaining macros perform re-sizing tasks, but *FinalWave* is a little more exciting than the rest. It can be used to add a wave effect to type. To use this macro you simply select the text you wish to wave and then run the *FinalWave* macro. As with the *FinalWrapper* macro you can enter several options – these include the sine-wave's amplitude and the number of waves you wish to create.



Yes, you too can make curly headings with FinalWrapper.

Overall this is an extremely impressive tool. The macros can be used to produce some pretty eye-catching results and are easy to use. Their quality, while not perfect, is more than acceptable. I would wholeheartedly recommend this collection to anyone who has a copy of *FinalWriter.*

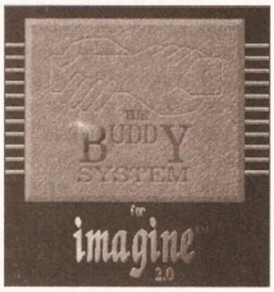
Product Rating 95%

IMAGINE BUDDY SYSTEM

17 Bit Software (3161A+B)

Learning to use a 3D-modelling program can be quite difficult and even frustrating at times. The best way to learn how to use a complicated program is to have a friend alongside, who already knows how to use the program, that you can turn to for help. The *Imagine Buddy System* is just that, but in computerised form. It's basically a hypertext system that contains information on *Imagine 2's* various editors and menus.

Imagine 2 is one of the most popular 3D programs available, it has become even more popular since it was given away with issue 53 of our sister magazine – *Amiga Format.* The *Buddy System* acts a bit like an on-line help facility, it provides information about any menu item. But it can do more than provide information, it can also demonstrate a variety of techniques.



Need a helping hand with Imagine 2? Then try the Buddy System.

The demos provide textual and audio explanations of which actions are being performed. To do this the *Buddy System* makes use of a program called Narrator. Narrator needs the translator library, so you must make sure it is in your libs directory.

The *Buddy System's* coverage of *Imagine's* features is very extensive. Every editor is covered by the Hypertext system and by the demonstrations. The information that is made available is presented in an easy-to-understand manner, so even the most inexperienced of ray-tracing novices can find help in a readily-digestible form. Some of the explanations can also be very in-depth – I learnt one or two new things about *Imagine.*

Navigating through this vast amount of information is potentially a difficult task. But, as the help is context sensitive, just point and click, you can easily find information that relates to your current task. You can also browse through the database information skipping from keyword to keyword. Another useful method of finding your way round is to perform a global search.

Despite the impressive help facility, my expectations of the *Buddy System* were let down a little when it came to the demonstrations. This was a wonderful idea; showing people how to use *Imagine* and talking them through it at the same time. Unfortunately, this system, in use, is far from perfect and it took a substantial amount of fiddling to get it to work properly. Certain demonstrations would simply go haywire halfway through, opening the wrong requesters and other strange things.

However, this is still a very impressive help system and should help plenty of experienced and inexperienced *Imagine*-users to get more out of the program.

Product Rating 93%

THE QUATERMASS EXPERIMENT, ISSUE 2

Immediate Arts

Sometimes I'm sorry that I missed out on the '50s. You had all these great classical sci-fi B-movies to choose from. For example you had the *Quatermass* series; *The Quatermass Experiment, Quatermass and the Pit* and the others. However, these halcyon days are not lost forever. *The Quatermass Experiment* is a disk-based magazine that attempts to recapture the magic of expressing wild new ideas.

It is released roughly every eight months and contains science-fiction stories by amateur writers. Some of them are quite entertaining, especially the IPAC (Interplanetary Army Corps) Epics. This section of the magazine is a collection of stories written by a few regular contributors. These stories are based in the IPAC universe – this is set in a time-period where mankind has been forced to move away from Earth. This move gives rise to all sorts of greed, corruption and general skullduggery. This is where IPAC come in, to police the galaxy.

It's difficult to give a verdict on this magazine – you will either like it, or you won't. Suffice to say, if this is the sort or thing you like, then you will like this sort of thing.

Product Rating 1-100%

COMMUNICATE 1.2

Magnetic Fields (ED039)

The way in which humans communicate is fascinating. There are so many methods, ones that are written, spoken and signalled. *Communicate* is a program that bravely attempts to cover a wide range of languages. These include sign languages and written codes.

Although this not a particularly new program, it has not been covered in this magazine before and it certainly merits some attention. *Communicate* is a novel program, not only in the communication methods it covers, but also in its teaching methods.

Regardless of the communication method you are learning, there will be square area of the screen that has been set aside for displaying letters in the language you have chosen. This area not only displays written codes but also demonstrates hand signs. This is particularly useful for sign language and the deaf-blind alphabet.

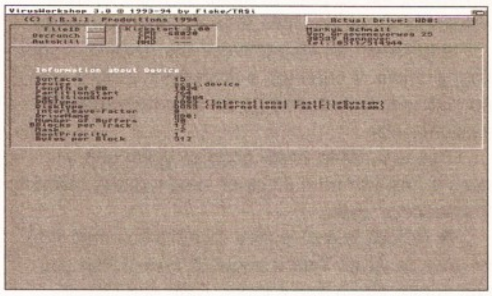
The way that this works is that an animated pair of hands make the sign that corresponds to the letter underneath them at the time. This is a great way of learning such languages as you can actually see them being "spoken".

Each language has several learning modes. You can either enter one letter at a time, a sentence at a time, subject yourself to a test or load in a ASCII document.

The methods of communication that have been covered by this program include; Braille, Semaphore, Flags, Morse Code, Naughts and Crosses Code (no, really!), two and one-handed Sign Language and the Deaf-Blind alphabet. I'm sure you'll agree that this is an extremely impressive list.

Indeed, this is an impressive program it is easy to use and is truly an innovative program.

Program Rating 93%



Don't let your system get ransacked by virus damage. Use Virus Workshop!

VIRUSWORKSHOP 3.8

Cynostic (U0246)

If you own a computer there is one thing you'll almost certainly encounter – computer viruses. Why people would use their computing knowledge in such an inane and usually malicious way is beyond me. Anyway, now that I've got that off my chest let's take a look at a program that was designed to help prevent the spread of viruses.

VirusWorkshop is a virus killer with some impressive credentials. It can check for Trojan horse programs, bootblock viruses, check crunched files, check your machine's memory and has support for hard drives.

But what is most impressive about the program is the number of viruses and file crunching formats that it can recognise. I really had no idea there were so many crunchers and viruses about – you would have to see the lists to believe them.

The program also takes advantage of Workbench 2+'s refinements to make it easy to use and give quick access to its functions. At first I couldn't believe that a single virus checker could take up 75 percent of a of floppy. But, now I can see why, although its size means it is unlikely to appear on the Subscribers' disk.

Program Rating 92%

BRUSHED PINK

Roberta Smith DTP (UT019)

No, this not a paint package at all, it's actually a compilation disk with several useful programs. There are six in all, Garshneblanker, BigListMaker, PFS, CBE, WBLock and CloudsAGA.

● CBE actually stands for ClipBoard Enhancer, and can be used to improve the functionality of your computer's clipboard. The clipboard has been part of the Amiga's operating system since Workbench 2. It can be used to copy data from an application to memory, for pasting, at a later time, into the same application or another.

This is a powerful feature which can be of great use, but, surprisingly, it has not been exploited fully. The Amiga is actually capable of storing a maximum of 256 blocks of information, but most programs only store one block at any time.

With CBE at your command you can make use of as many of these clip blocks as possible with your available memory. The way in which this works is very simple; CBE keeps a record of all of the clipboard locations, and then allows you to change their positions. The clip that is at the top of the list is the one that will be recognised by whatever application you are running.

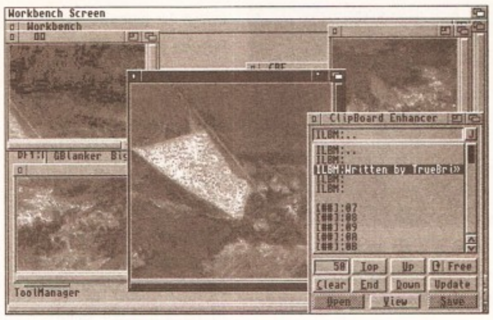
Of course it can be a bit of a pain having to switch from one screen to another every time you wish to change the current clip. To get around this inconvenience CBE has a special Jump mode. The Jump button will force the CBE control window to the next available screen. Be warned though, this can produce unpredictable results and, as the AmigaGuide documentation describes it: "it is not a system friendly option". I tested it on a couple of programs – *Personal Paint*, *Brilliance* and *Edge*, and found little or no problems with all but *Brilliance*. You can also use the program's global cut and paste function key-combinations.

This handy little program has thoroughly impressed me – so much so that it has been included on the Subscribers' disk.

● Garshneblanker is, not surprisingly, a screen blanker. It comes with a collection of 14 screen-saving modules for you to choose from. The program is not a particularly outstanding example of a screen-saver. It has most of the options you would expect, such as setting an activation time, selecting the module you wish to be displayed and setting the options for the module.

However, the modules themselves are pretty uninspiring. None of them are particularly innovative, if you already have a screen-saver you will have already seen most of them before. It's a shame, with a name like Garshneblanker I was expecting something a little different, but this is just another average screen-saver.

● CloudsAGA is a small graphics utility that creates cloud-like images, which can then be saved



The ClipBoard Enhancer can be used to store up to 256 clipboard items.

as an IFF file for use in paint packages or 3D programs. Unfortunately, the program is a little limited – at the moment you cannot control the palette and I cannot find anyway of alter the clouds appearance. It seems the only option you have any control over is the size of the image – 25, 50, 75 or 100 per cent of the full size.

● WbLock is another simple program, but is of more use than CloudsAGA. Its sole purpose is to stop people accessing your machine without your permission. This can be useful if you are working on something of a secretive nature, or if you just don't want anybody fiddling around with your stuff.

The program works by blacking out your Workbench screen. Of course, I tried getting around this system. I pulled down the Workbench screen using the left-Amiga key and left-mouse button combination. To my glee this revealed the screen underneath, but as soon as clicked on it the mouse-pointer went haywire – rats! It would seem then, that, Wblock does its job quite well. It is also very easy to use; you just run the program, type in you password, press the Lock button and when you wish to return to Workbench, re-enter your password.

● BigListMaker has been designed to catalogue your collection of programs. It can be

PUBLIC PERSONALITY

PD PROFILE ON-LINE PD

On-line PD is a relatively new PD library, but despite that they have a respectable collection of disks. As well as being a PD library, On-Line PD is BBS too, I've logged on a couple of times myself. The library is run by Jed Ekins and Nick Upritchard. We caught up with Nick to find out a little bit about them and how they are they are getting on.

Why did you guys decide to start up PD library?

We'd been using Amigas for many, many years – since Workbench 1.2, and we thought might be fun to try our hand at running a PD library.

How have you found it so far?

Business is picking up all the time, we've had a few letters already, saying we're doing a good job.

How many disks do you have in your collection at the moment?

We've just got in a few new CDs, and that will bring our total up to around 7,500 disks. But we're going to have to catalogue 2,500 of those during this week.

Which CD-ROMs do you stock?

We've got all the 17 Bit ones, the latest PD Soft CD-ROM, Fred Fish up to 1000 and variety of others. We also do a Pic-and-mix service as well, this is where you can choose different samples, modules or whatever and mix them onto a disk. Obviously we charge more for this service, but quite a few people have already been using it.

I've noticed you also run a BBS as well, have you found that running the two go hand-in-hand?

So far, there are really only a few subscribers – a lot of people think they can just log-on and download stuff without uploading anything in return. But, it works as a bit of an advert, people download the catalogue which is available on-line freely. It's not worked out badly, and people are taking advantage of the week-end cheap rates.

What do you think is the best thing about the current Amiga PD scene?

I think the availability of all the serious utilities that are around at the moment is great.

What have you found is the worst part about running a PD library?

Copying all those disks, and then cataloguing them too.

Finally, where do think the future of Amiga PD lies?

A lot of things are going on to CD-ROM, but you've still always got games and utilities which come out too frequently to be included on CD collections immediately. I think their will always be a future for floppy disks in PD, a lot of people don't want, or can't afford, to spend a great deal of money on a CD-ROM.



This is one of the screensaving modules that come with Gblanker.

used to catalogue whole disks or individual programs or files. You can also add comments to each entry, so you can find programs by their descriptions as well as their names. You can also maintain several lists, so you can even have a list for each category of programs. Another useful feature is the program's search function, which can be used to search for a text string. The program does serve a useful function, but doesn't provide any services that is not provided by disk cataloguing programs.

● PFS stands for Professional File System – it is an alternative file system to the Amiga Standard OFS, FFS and FFS-DC. It's a shareware program written by a chap by the name of Michiel Pelt. Apparently he was a little cheesed off with the way the Amiga formatted disks, so he set about improving things by creating his own format. The PFS is substantially faster than FFS, the author claims that it can written to 2-3 times faster, read 50 per cent quicker and directory scans can be performed 10-20 times faster than FFS.

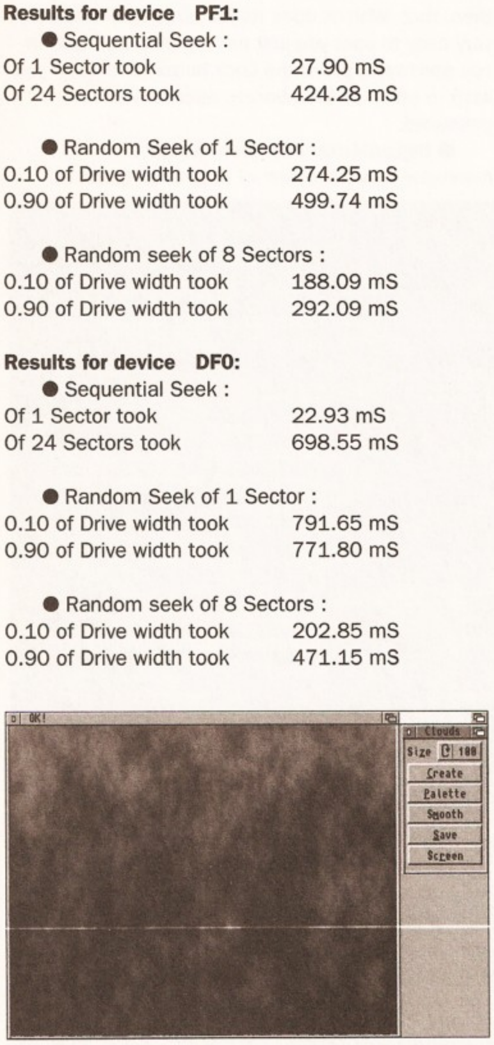
We tried to confirm these claims using Sysinfo and SeekSpeed, but comparing PFS with a FFS-DC (Directory-Cached) disk which is faster than the normal FFS format. Here are some of the results from SeekSpeed:

Results for device PF1:

● Sequential Seek :	
Of 1 Sector took	27.90 mS
Of 24 Sectors took	424.28 mS
● Random Seek of 1 Sector :	
0.10 of Drive width took	274.25 mS
0.90 of Drive width took	499.74 mS
● Random seek of 8 Sectors :	
0.10 of Drive width took	188.09 mS
0.90 of Drive width took	292.09 mS

Results for device DF0:

● Sequential Seek :	
Of 1 Sector took	22.93 mS
Of 24 Sectors took	698.55 mS
● Random Seek of 1 Sector :	
0.10 of Drive width took	791.65 mS
0.90 of Drive width took	771.80 mS
● Random seek of 8 Sectors :	
0.10 of Drive width took	202.85 mS
0.90 of Drive width took	471.15 mS



Er... this is a cloud, honest – it's just been made with one those fancy fractal programs.

These results are quite impressive, but you really have to use the system to gain an understanding of how much quicker it is. You can do just that if you are a subscriber, as it is on this month's disk.

This is a mixed disk with a few highlights, namely CBE, PFS and WbLock. Although the other programs are nothing special these three especially PFS and CBE are a good enough reason to get this disk.

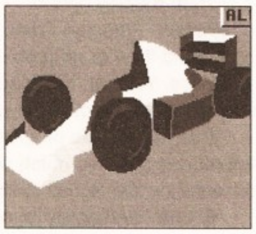
Product Rating 86%

ROBS HOT STASH #9

17 Bit Software (3192)

Now this is a disk stuffed to bursting-point with loads of interesting and useful programs.

● F1GP-Ed is first up and falls into the interesting category. It's basically an editor for Microprose's excellent (or so I've heard, not that I would use my Amiga for anything but the most serious of tasks...) Formula One Grand Prix racing simulator (F1GP).



The F1GP editor can be used to design your dream F1 team.

It can be used to create the data files used by F1GP. These files can contain any information from the names of drivers, the teams they drive for, their performance, the colour of their car and helmet and the pit crew's outfit. These functions can enable you to easily keep up with the changes in the real motor racing world, or to create your own custom made teams.

The program is very straight-forward to use, you have several buttons to choose which details you would like to change. If the alterations you intend to make require some sort of graphical feedback, such as editing the car, pit crew or helmet, you'll be taken to another screen. These screens will allow you to make adjustments and gain immediate feedback on how your designs will appear in the game.

This is a useful program if you take your racing seriously, but obviously you will need the game to get the best out of the program.

● *AddPower* is both an innovative and useful Workbench 2+ program. Its greatest pleasure in life is to add functionality to Workbench and make your life easier. It adds a number of enhancements to Workbench, both aesthetic and time-saving ones.

One of the features of the program that will help keep your desktop tidy is the window control hotkeys. These keys can be used to centre windows, select the next one and zip windows (grow or shrink windows). You can also choose to have every window centred as soon as they are opened.

The Fixmenu option is an added bonus for Workbench 3-users. This will set up all windows for newlook menus and give them their proper colours. This means that any window that is opened by a program will have the same colours and window style as found in your Workbench preferences file (useful when running some older programs).

The Fixscreen option does a similar job in formatting any new screen that is opened. It'll make sure that the screen is centred, has the correct palette and uses the preferences-defined font.

But *Addpower's* talents do not end there, it also has plenty of features for Shell-users. First off you can open a new Shell window using a hotkey combination.

Once the window has been opened you can make use of the Multidir feature. Normally if you attempt to make a directory within a directory that does not exist, then AmigaDOS will refuse to make one. This feature however, can be used to make a whole string of directories in one go – very handy.

WildStar replaces the traditional '#?' wildcard command with an asterisk character '*'.

AssignSYS is yet another useful command – it can be used to make assignments for all of your system directories. If you have ever tried assigning your system directory to another disk you'll know what a pain it can be assigning the Fonts:, LIBS: and other directories. *AddPower's* AssignSYS command will attempt to make as many system assignments as possible from a single command.

AddPower can also improve the running of your floppy drives. It can stop a drive from clicking when no disk is inserted, change its step-rate and alter its buffer size.

This is a really, really good program and as such it has earned a place on next months brilliant Subscribers' disk.

● *DClock* is a cute little digital clock that sits on your desktop. That's about it, except that you can set an alarm and a timer. Cute and vaguely useful, I suppose.

● *MemInfo* is an interesting little program – not only does it, as you might expect, display how much memory you have spare, it can also be set to display how much free space is left on any volume. It also displays the date and timel.

But, the good thing about is the choice of units and methods that can be selected for displaying information. For example, you can have your available memory displayed as bytes, K, Mb, percentage used or percentage remaining. You can also display the largest unused chunk of Fast or Chip RAM.

This must be one of the most complete resource displaying utilities available – the only thing it doesn't show you is how much is left in your bank account.

● One of the things that annoy Nick, our Art Ed, is receiving disks with graphics files which have the wrong extension. However, changing the extension of a large number of files can be quite tedious.

This is when a program like *NewExt* can save you time and loads of grief. It can be used to the rename the extension of all the files in a directory. For example, you could change all the files in a directory with the extension .pic to IFF.

This is an impressive collection which has plenty of other good programs as well.

Product Rating 84%

PLEASE RELEASE ME

Roberta Smith DTP (McC003)



Tammy Wynette fans beware, "Please release me" may cause offense.

Bizarre is one of my favourite words and it is the only word that can adequately describe *Please Release Me*. It's an animation from Iain B McCaffrey, which can be played on any Amiga with 1Mb. It was made using *DPaint IV* and *MovieSetter* and runs for about 50 seconds.

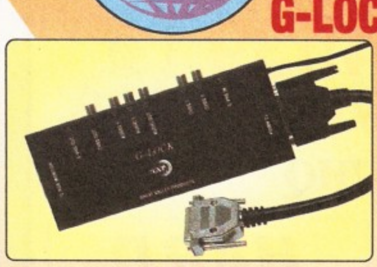
If you think the title of this animation sounds familiar, it's because it's also the title of a song by

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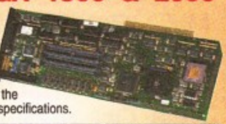
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"WHITE KNIGHT TECHNOLOGY", P.O. BOX 2395, WALTHAM CROSS, HERTS. EN8 7HQ

Tammy Wynette. It is this song that is the butt of this humourous animation. It starts off with a view of a female singer's head, which is nodding from side-to-side, as it sings, "Please release me, let me go". As it sings this last bit the camera zooms out to reveal that the head is actually an inflated balloon, which is released by a pair of fingers. The head then flies around the screen, deflates and slowly falls from view.

It's simple, but it is also well-animated and unfeasibly funny. If you are in need of a good chuckle, then I would advise to order this disk straight away – I guarantee you will be in stitches.

Product Bizarreness 92%

CYNOSTIC UTILITY COLLECTION #56

Here's another varied disk collection, combining fun programs with practical ones. There are only three programs on this disk, yet it is 97 per cent full, so it would seem that the guys at Cynostic are attempting to go for quality rather than quantity. The three programs are *Addinfo 1.2, DiskCat 2.7* and *PosterBrot 1.6*.

● *PosterBrot* is an interesting program – it creates poster-sized Mandlebrot sets. I don't know, there must be something mathematically mystical about fractals, as there seems to be an endless stream of fractal-based programs.

PosterBrot is a clever program that will no doubt appeal to the followers of the Mandel. It can be used to create poster-sized printouts of Mandlebrot fractals even if you only have a normal A4 printer. The reason it can do this is that it tiles images. It is a Workbench 2 and CLI-only program which needs an output file to be specified as an option.

Once you have executed the program you will be asked to input a number of attributes. First of all the program will ask you for the Mandlebrot attributes, the minimum and maximum values for the y and x axis. It will then need the poster attributes, which should entered as the number of pages for the width and height of the poster. Finally you will be asked to the page attributes in pixels.

Once it has this information *PosterBrot* will go to work. After a wait that depends on the hardware you have and whether you are running the FPU or Vanilla (no FPU) version, the program will output a PGM file. To print the file you will need a program that can handle this format. Unfortunately the only program I know about that can do this is *ImageFX*, but there may be a couple of PD programs lurking around that can as well.

This is a potentially useful program, but because of the difficulty you are likely to encounter in finding a program that can print the posters I wouldn't recommend this program. As well as this, you will have to find your own co-ordinates to do this you'll need another fractal program. It's a shame, it sounded like such a good idea too.

● *Addinfo* is another program that sounds like a good idea. It has been designed to add icons to iconless files automatically. To achieve this end the program uses the Whatis.library to identify the file's type. Sounds like a good idea doesn't it?

Installing *Addinfo* should be a piece of cake as it comes with its own installation script. Unfortunately, things turned completely differently. I ended up wasting an entire morning and a good part of the afternoon, trying to get the thing to work. In fact, as it turned out, the solution was quite simple, but the instruction were of no help at all and the program's quirky file selector only made matters worse.

Anyway, after much tearing apart of garments and beating of my desk I got it to work. Once set-up all you have to do to add an icon is select *Addinfo* and shift double-click the file. The program will then use the library determine the file's type, it will then automatically add the right icon. Alternatively, there is an even easier option, you can use *Addinfo* as Toolmanager tool and simple select the file and then pull-down *Addinfo* from the menu.

Sounds easy, doesn't it? But getting to that stage took more effort than it was worth. I have now removed the program from my hard disk to help blot out the memory of that wasted morning.

● This has not been good day for me, if things carry on as they have been I will probably crash my car on my way home. Yes, that's right, another program has been giving me grief! That's the last straw, I've applied for a job on one of Future Publishing's cross stitching titles. The name of the offending program is *Disk Cat*, a seemingly innocent disk cataloguing program.

Like many other programs of its ilk, *Disk Cat* can quite happily catalogue the contents of a disk. It can also perform sorts and searches. If this all sounds a little boring, then wait until you hear the best bit. If you run the program on a 1200, then there is a good chance that the program will crash half way through reading the contents of a directory – exciting, or what?

In fairness it's probably not the programmer's fault. The source of the problem probably lies with the fact the program was written in AMOS. A good few of the programs I have problems with are written in AMOS. Well there you go, not a particularly awe-inspiring collection bearing in mind the quality of Cynostic's previous collections. To get the best out of this collection you really have to be prepared to fiddle around with the programs.

Product Rating 67%

TOP TEN PD CHART – IT'S THE ONLY CHART THAT COUNTS

This month we continue our quest to keep you up-to-date with the most popular PD at the moment. We give you a list of the top ten programs and disks that have been ordered from two PD libraries. It gives you a chance to see which programs are popular with your fellow Amiga-users.

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2	DF "Adult" board game
3	Amiga Report Electronic Magazine 2.23
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8	ARCHandler
9	GCC 2.60 documentation
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UK Aminet site- FTP.DOC.IC.AC.UK

	VIRUS FREE PD
1	Spectrum Emulator V2
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Orion PD, Mr Modarne, 14 Ouston Close, Wardley, Gateshead, NE10 8D2. Telephone 091/438/5021.
Pathfinder PD, 41 Marion Street, Bingley, West Yorkshire, BD16 4NQ. Telephone (0274) 565205. Catalogue, Free if a s.a.e. is sent. Do not accept phone orders, credit cards or direct debit. Open 9.30am - 5pm. Additional info, we have our 6,000 titles in our library and also our PC shareware.
PD Soft, 1 Bryant Avenue, Southend-on-Sea, Essex, SS1 2YD. Telephone (0702) 466933, Fax (0702) 617123. Specialist areas: Utilities and games. Catalogue Free. Accept phone orders, credit cards and direct debit. Open 9am to 7pm (Monday to Saturday). Additional info, PC+Amiga + CD.
Penguin Public Domain, P.O. Box 179, Reading, Berkshire, RG3 3DD. Telephone none. Specialist areas Fred Fish and all other areas. Catalogue free but stamps appreciated. Do not accept phone orders, credit cards or direct debit. Postal only. Additional info, all machines catered for 500/500+/600/1200.
Phils 'Aga' PD, 101 Grove Road, Gosport, Hampshire, PO12 4JJ. Specialist areas: 'Aga' based Amiga only. Catalogue send S.A.E. Do not accept phone orders, credit cards or direct debit. Open for mail order only. Additional info, PD is .50p a disk.
Pinnacle PD, 134 Buarth-y-Capel, Ynysybwl Pontypridd, Mid Glam, CF37 3PA. Telephone (0443) 790996. Catalogue, disk £1.00 inc p&p. Additional info: the first quality orientated PD library.
Riverdene PDL, 30A School Road, Tilehurst, Reading, Berkshire, RG3 5AN. Telephone (0734) 452416, Fax (0734) 451239. Specialist areas: Video applications. Catalogue £1.00. Accept phone orders, credit cards and direct debit. Open 9am to 5.30pm, (24 hour answerphone). Additional info, established since 1987.
Roberta Smith DTP, 190 Falloden Way, London, NW11 6JE. Telephone 081/455/1626. Specialist areas: utilities, education, animation. Catalogue .50p + .50p p&p or a blank disk + S.S.A.E. Accept mail order by return of post. Do not accept credit cards or direct debit. Open from 10am-6pm Monday to Friday, 9am-12.30pm Saturday. Additional info, we have a strong leaning to desk top media publishing.
Saddle Tramps PD, 1 Lower Mill Close, Goldthorpe, Rotherham, South Yorkshire S63 9BY. Telephone (0709) 888 127. Catalogue is 50p. Accept phone orders, but no credit cards or direct debit. Open all day, every day. New library, first catalogue disk, expanding daily. Stock small items, ie. boxes, mats, labels etc.
Scribble PD, 2 Hillside Cottages, Burstall, Suffolk. Telephone (0473)652588. Catalogue £1.00. Accept phone enquiries only. Do not accept credit cards or direct debit. Open from 09.30am - 5.30pm. Additional info, any PD/Shareware title can be ordered at no extra cost.
Seasoft Computing, The Business Centre, 80 Woodlands Ave, Rustington, Sussex, BN16 3EY. Telephone (0903) 850378. Specialises in Amiga Public Domain/ Licenceware/ CD ROMS/accessories etc. Catalogue free of charge with first order. Accept phone orders, credit cards and direct debit. Open 10am - 7pm Monday to Friday, until 5pm on Saturday.
Software Expressions, 117 Kennington Avenue, Bishopston, Bristol, BS7 9EX. Telephone (0272) 425987, Fax is the same number. Specialist areas: Preponderance of PD games. Catalogue Free. Accept phone orders, credit cards and direct debit, (except switch). 9.30am - 5pm. Additional info, please state Amiga models when ordering.
Startronics, 39 Lambton Road, Chorlton, Manchester, M21 1ZJ. Telephone 061/881/8994. Specialist areas: 1.3 Software. Catalogue Free to customers orders. Accept phone orders, credit cards and direct debit. Open 9.30am - 5pm.
Telescan Computer Services, PO Box 1, Thronton-Cleveleys, Lancs, FY5 1SH. Telephone (0253) 829292. Catalogue, disk catalogue - 3 stamps. Accept phone orders, credit cards and direct debit. Open 10am to 5pm. Additional info, also PC.
The Official Amos PD Library, 17 Wick Farm Road, St Lawrence Bay, Southminster, Essex, CMO 7PF. Telephone and Fax (0621) 778804. Specialist areas: Amos programs, source-code disks, totally Amos disk magazine. Catalogue £1.00 disk s.a.e. for printed info. Do not accept phone orders, credit cards or direct debit. Open, postal only orders, queries and reasonable hour. Additional, We are the only Amos only PD library in the UK, with the longest running disk magazine for Amos users.
Vally PD, P.O. Box 15, Peterlee, Co Durham, SR8 1NZ. Telephone 091/587/1195, Fax 091/587/1195. Specialist areas: PD + Shareware for Amiga + PC, CD ROMS, + CLR Licenceware. Catalogue .75p inc p&p. Accept phone orders, credit cards and direct debit. Open 9am - 6pm. Additional info: part of the 'UPD' group.
Virus Free PD, 139 Victoria Road, Swindon, Wiltshire, SN2 3BU. Telephone (0793) 432176, Fax (0793) 514187. Catalogue £1.00 or 4 x 1st class stamps. Accept phone orders and credit cards. Open 9.30am - 5.30pm Monday to Saturday. Have been trading for 5 years in PD.
Visage Computers Public Domain Library, 18 Station Road, Ilkeston, Derbyshire, DE7 5LD. Telephone (0602) 444501, Fax (0602) 444501. Specialist areas: Amiga hardware, software and peripherals as well as PD. Catalogue .50p. Accept phone orders and credit cards, but not switch. Open 9am - 5pm Monday to Saturday.
Your Choice PD, 39 Lambton Road, Charlton - cum - Hardy, Manchester, M21 0ZJ. Telephone 061/881/8994. Specialist areas: licenceware. Catalogue FREE with order. Accept phone orders, credit cards and direct debit. Open from 9.30am - 5pm Monday Saturday. AS

MARKET PLACE SHOPPING

Don't forget to turn to *Amiga Shopper's* 'Market Place' section (page 42-43) for a taste of what some of the best PD Houses in the country have to offer.

Don't miss it!

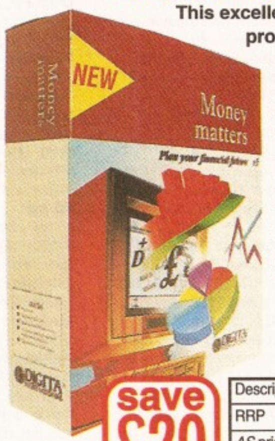
AMIGA SHOPPER

We want you to have the best for your Amiga, and we don't want you to break the bank to get it, so check out our Amiga Shopper readers' offers, all at low, low prices.

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Don't miss out! Turn to page 66 NOW to check out our amazing *AS* subscriptions offers. To order your back issues turn to page 60.

Money Matters 3



This excellent home accounts program is easy to use, flexible, powerful and fast. *Money Matters 3* includes features that enable you to view the data in the form of graphs or pie charts to help you keep track of your cash. Don't get lost in the money maze!

save £20

Description	Money Matters 3
RRP	£49.99
AS price	£29.99
Order code	AMSMM

Blitz Basic 2



This powerful and flexible *BASIC* programming language from Acid Software has faster compiling and coding, new commands, and everything from *C* structures to an online assembler. This package comes with a manual, a user guide, four issues of the *Blitz User Mag* and five disks full of *Blitz Basic* games extensions, and examples.

save £20

Description	Blitz Basic 2
RRP	£69.95
AS price	£49.95
Order code	AMSBB2

Wordworth 2

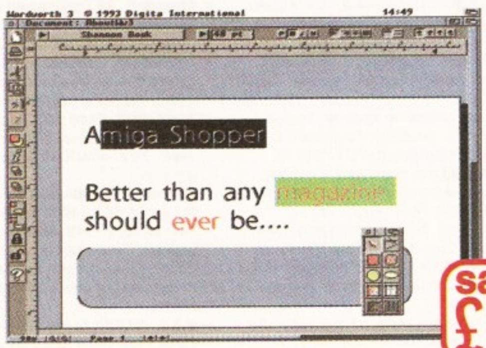


Although it has now been overtaken by *Wordworth 3*, this is still an excellent word processing program, especially at this price. *Wordworth 2* from Digita is a powerful, fast and packed with features such as Intellifont, which enables you to use fonts from 4 to 800 points in size, mail merging, a large dictionary and thesaurus, and an indexing system. An extremely powerful, flexible program which will suit nearly every Amiga user.

save £80

Description	Wordworth 2
RRP	£129.99
AS price	£49.99
Order code	AMS266

Wordworth 3



The third incarnation of this excellent Amiga word processor adds a compendious range of new features, including editable pop up gadgets, font sensitive requesters and a user editable tool bar which can be placed either along the top of the screen or the side.

save £50

Description	Wordworth 3
RRP	£149.99
AS price	£99.99
Order code	AMSWW3

megalosound

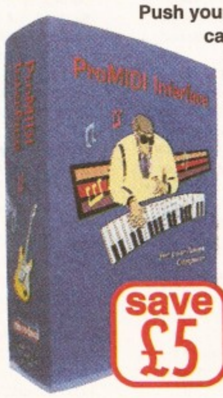


Enter the exciting world of sound sampling with MicroDeal's brilliant *Megalosound* sampler. *Megalosound* enables you to grab your own samples, edit them to suit your requirements, and then mess them up again with *Megalosound*'s many fun effects.

save £10

Description	Megalosound
RRP	£34.95
AS price	£24.95
Order code	ASMEGA

midi interface



Push your Amiga's musical capabilities to its limits with the fully-featured ProMIDI interface which enables you to connect synthesisers and drum machines to your Amiga and then use the samples with *Amiga Format's Music-X* and *OctaMED* Coverdisks.

save £5

Description	Midi Interface
RRP	£24.95
AS price	£19.95
Order code	ASMIDI

AS binder



If your mags live in large piles on the floor, and you can never find the one you want, then keep your *AS* collection neat and tidy with these practical, yet stylish, white *AS* binders.

Description	One binder
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Description	Two binders
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Order code	AS109

Technosound Turbo 2

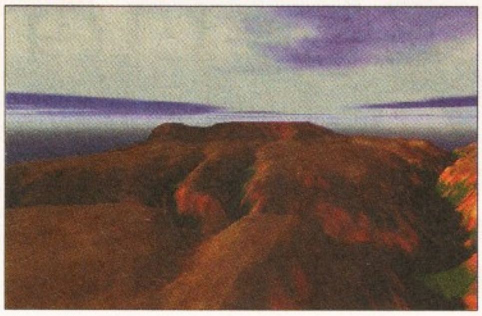


Like the original *Technosound Turbo*, version two of this sampler from New Dimensions enables you to grab digitised sounds and sequence them into compositions. But it also features many improvements and new functions, including direct-to-hard disk recording, and a built-in tracker. The package contains a digitiser and a set of audio leads.

save £10

Description	Technosound Turbo 2
RRP	£39.99
AS price	£29.99
Order code	AMSTT2

VISTA PRO LITE

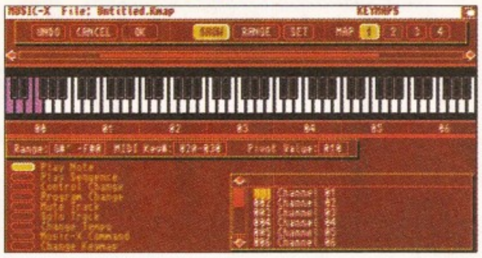


This amazing fractal landscape program from Meridian enables you to build your own scenery on your Amiga. Then you can animate it to create stunning fly-bys, or use it as backgrounds in your own games, pictures or 3D renders. And it even works on standard A1200s.

save £20

Description	Vista Pro Lite
RRP	£59.95
AS price	£39.95
Order code	AMSVIST

Music-X 2



This sequencer package is one of the most ground-breaking releases since the original *Music-X* made such a huge impact in 1989. *Music-X 2* is a full MIDI sequencing package for controlling synthesisers, drum machines and other MIDI equipment, or you can use it with internal Amiga samples. The leading sequencer for the Amiga.

save £30

Description	Music-X 2
RRP	£149
AS price	£119
Order code	AMSMX2

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If you're interested in leisure computing and interactive entertainment then you can't afford to miss this year's FES.

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AMS/42

☐ Tick here if you don't want to receive special offers from other specially-selected companies

Your guide to safer AMIGA Shopping

Getting confused in the alluring shopping jungle is easy. Amiga Shopper leads the way to a better buy.

Colourful adverts tempt you with amazing pieces of equipment and software for your Amiga. They are faster, bigger, better and you are just dying to get your hands on them. Your first step to avoid dishonest businesses (thankfully they are a small minority, but all it takes is one!) and ultimately disappointment on your behalf, is to read our Safe Shopping advice. Follow a few simple steps and the Amiga kit of your dreams will safely be yours.

BUYING IN PERSON

- Where possible, always test any software and hardware in the shop before taking it home, to make sure that everything works properly.
- Make sure you have all the necessary leads, manuals or other accessories you should have.
- Don't forget to keep your receipt.

BUYING BY PHONE

- Be as clear as you possibly can when stating what you want to buy and make absolutely sure you confirm all the technical details. Things to bear in mind are: version numbers, memory requirements, other hardware or software required, and compatibility with your Amiga (be sure you know which version of Kickstart you have).
- Check the price you are asked to pay, and make sure that it's the same as the price advertised.
- Check that what you are ordering is actually in stock.
- Check when and how the article will be delivered, and that any extra charges are as stated on the advert.
- Note the date and name of the person you are ordering from.

BUYING BY POST

- You must remember to clearly state exactly what you are buying, at what price (refer to the magazine, page and issue number where it's advertised) and give any relevant informationabout your system set-up that will reduce the risk of hiccups.
- Make sure you keep copies of all correspondence.

MAKING RETURNS

You are entitled to return a product if it fails to meet one of the following criteria:

A The goods must be of 'merchantable quality.'

C They must be "as described".

D They must be fit for the purpose for which they were sold, or for the purpose you specified when ordering.

If they fail to satisfy any or all of the criteria, then you are entitled to:

- Return them for a refund.
- Receive compensation for part of the value.
- Get a replacement or free repair.
- When returning a product, ensure you have proof of purchase and that you return the itemas soon as possible after receiving it. That's why it is important to check it thoroughly as soon as it is delivered.

GETTING REPAIRS

- Always check the conditions of the guarantee, and servicing and replacement policy.
- Always fill in and return warranty cards as soon as possible, and make sure that you are aware of all the conditions in the guarantee.

BUYING PD

- Even though PD software is relatively inexpensive, you should still apply the guidelines set out above, making sure that you confirm all orders as clearly as possible.
- Shopping around is still important when buying PD because different sources charge different prices for the same disks. There is no set pricing structure for disks, but bear in mind that PD houses are meant to be non-profit- making operations.

Buying by Mail – Ten Steps to Safety

When you're buying from any mail order company, it's worth following *Amiga Shopper's* useful guidelines to avoid confusion and disappointment:

1.) Before you send any money, ring the supplier to make sure the item you require is in stock. Ask questions about the company's policy on delivery and returns of faulty equipment. Make sure that there are no hidden costs such as postage and packaging. Find out when you can *realistically* expect to receive your goods.

2.) Always read the small print in adverts. This is normally where the unpleasant surprises are hidden

3.) Beware companies that do not include their address on their adverts. Also, avoid companies which do not answer or return your calls.

4.) By far the best method of payment is by credit card. If ordering goods of more than £100 in total value, remember that you are legally entitled to claim compensation from some credit companies if the retailer goes bust. Check your credit card company's policy carefully. You can also try to get extra insurance in advance.

5.) If you're not paying by credit card, pay by cheque. Never send cash, and avoid using postal orders.

6.) Keep records. If you are buying by credit card keep a note of the time of the order and ask for an order number. When ordering anything over the telephone, always double-check the price.

7.) When sending a cheque keep a note of the cheque number, the date and the exact value. Make sure you know the exact name of the mail order company.

8.) When you receive your goods, check them carefully. If anything is missing or faulty, contact the supplier immediately.

9.) Always order from the most recent issue of *Amiga Shopper*.

10.) If a problem does arise, contact the supplier in the first instance. Calmly and politely tell them your problem. Most problems turn out to be minor hitches or misunderstandings that can easily be resolved. If you think you have a genuine grievance, contact your local Trading Standards Officer. The number is in the phone book.

ADVERTISERS INDEX

Go Faster Stripes

This month we've got together with Silica to bring you an absolutely stonking competition. You could win a rather nice GVP A1200 accelerator, including an FPU and 4Mb of RAM. Cor! Plus, we have a special bonus question. Get this right and you could win a GVP 1291 SCSI interface, so you can add SCSI CD-ROMs, hard disks and all manner of other wonderful SCSI peripherals to your A1200.

To enter, simply write the answers to the questions below on the back of a postcard (along with your name, address and post code) and send them to this address:

Get into the fast lane
Amiga Shopper
30 Monmouth St, Bath, Avon BA1 2BT

Or, you can E-Mail your answers to us at: Fastlane@Amshop.Demon.Co.UK



The Questions

1 – What is the speed of the CPU on the GVP 1230 II accelerator?

2 – How much memory can you fit to the GVP 1230 II?

3 – Who created the Image on this page?

Bonus Question – What does SCSI stand for?

You'll find all the answers in this issue of *Amiga Shopper*, so get reading!

MADAMS MODEMS!

We had an extremely good response to our Modems competition, including several entries received by E-Mail. In order to ensure fair play, we printed them all out and stuck them in the same velvet-lined box where all the other entries were stashed and then drew out the five winners. The winners are:

First prize (A US Robotics V.32 Terbo modem and free Internet access from US Robotics for a year)

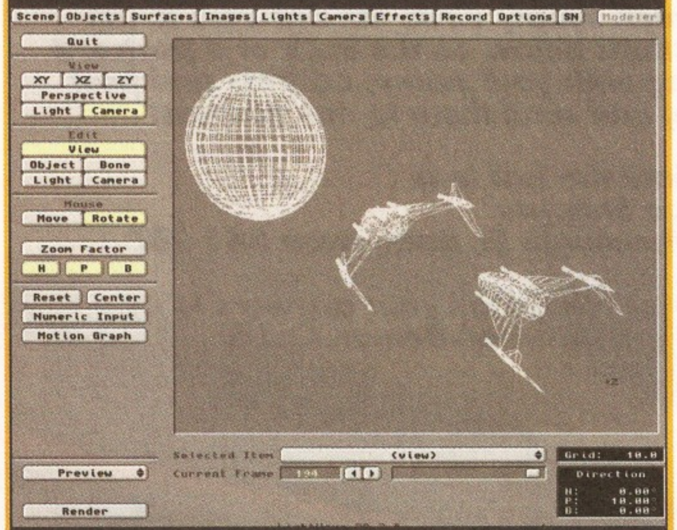
Luis Trinidade dos Santos from Loures in Portugal

Other prizes (Free Internet access for a year from Demon Internet Services)

Jonathan McBrien of Enniskillen
Dr J Thomsan of Dundee
Andrew Bennet of Leyton
Mr P Davis of Newbury

Congratulations to you lot! You will be contacted by the companies who offered the prizes shortly.

Lightwave



The Real Review

Next month we will be taking apart what promises to be the best 3D program on any computer – Newtek's Lightwave 3D Standalone, with opinions and tips from animators the world over. Plus, the next installments in our Assembler and Chess tutorials.

On sale Tuesday 4th October. £2.50

BE SURE TO AVOID DISAPPOINTMENT – RESERVE YOUR FAVOURITE MAGAZINE AT YOUR LOCAL NEWSAGENT NOW!

• *PS Oh, and if you do have any problems getting hold of your favourite Amiga mag, call Kate Elston on 0225 442244 and she'll help you out.*

DEAR NEWSAGENT, Please reserve/deliver me a copy of *Amiga Shopper* every month, beginning with the November issue, going on sale on Tuesday 4 October.

Name ____________________

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• NOTE TO NEWSAGENT: *Amiga Shopper* is published by Future Publishing (0225 442244) and is available from your local wholesaler.

AT-A-GLANCE GUIDE

To help you find what you want quickly, here is a cross-referenced list of everything covered in this month's Amiga Shopper. You'll find a detailed index to the problem-solving Amiga Answers section on page 44. The page numbers given are for the first page of the article in which the subject is mentioned.

Are there any products or subjects you'd like us to take a look at? Well, just drop a line to:
Amiga Shopper,
30 Monmouth Street, Bath, Avon BA1 2BW.

AMIGA SHOPPER

Issue 42 – October 1994

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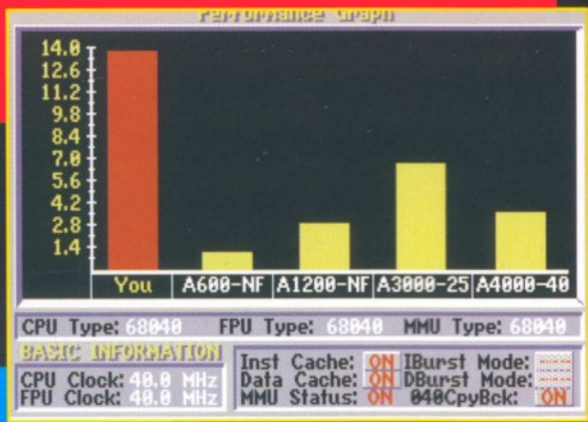
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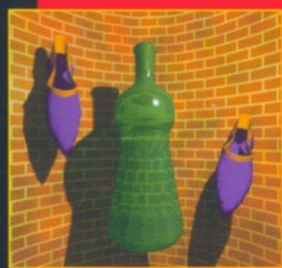
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Can the Warp Engine put your Amiga into hyperspace? We review the state of the art in A4000 accelerators from MacroSystem Developments. See page 15.



Let Cliff Ramshaw introduce you to the black art of writing chess programs in the first part of our new series. See page 52.

Have you ever wanted to know how to program in Assembler but were afraid to ask? Fear no more! Our new tutorial will show you exactly what you need to program in Assembler and get the most out of your Amiga. See page 28.



Could Freeform make your 3D modelling life easier? Gary Whiteley investigates this new spline modelling package on page 22.



Don't let them grind you down! Let our team of Amiga experts solve all of those annoying Amiga problems in our acclaimed Amiga Answers section. See page 44.

Which A1200 Expansion card could put your machine into the fast lane? Should you go for a RAM card or spend the extra on an accelerator? How much bang do you get for your buck? Mark Smiddy reviews and rates the options in our comprehensive supertest, starting on page 10.

